

MEDICAL PROCEEDINGS

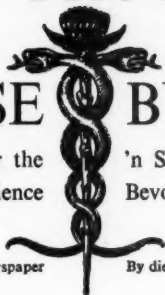
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Voorkoming van Blindheid by die Bantoes

Prevention of Blindness in the Bantu · Trachoma

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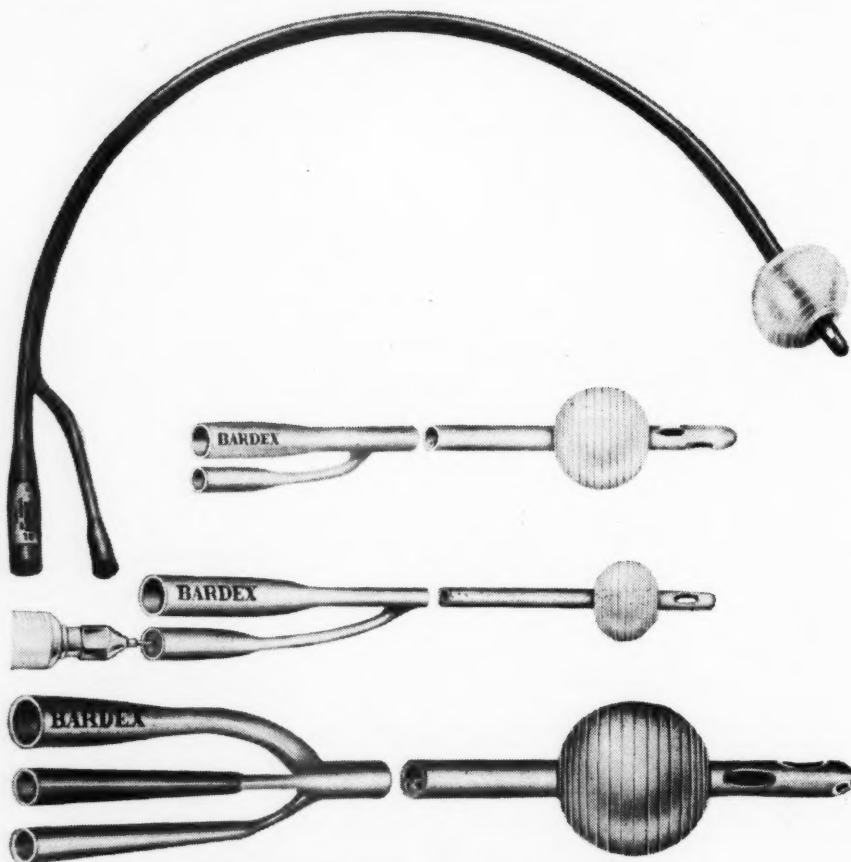
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Ref. ENGLISH et al., Antibiotics and
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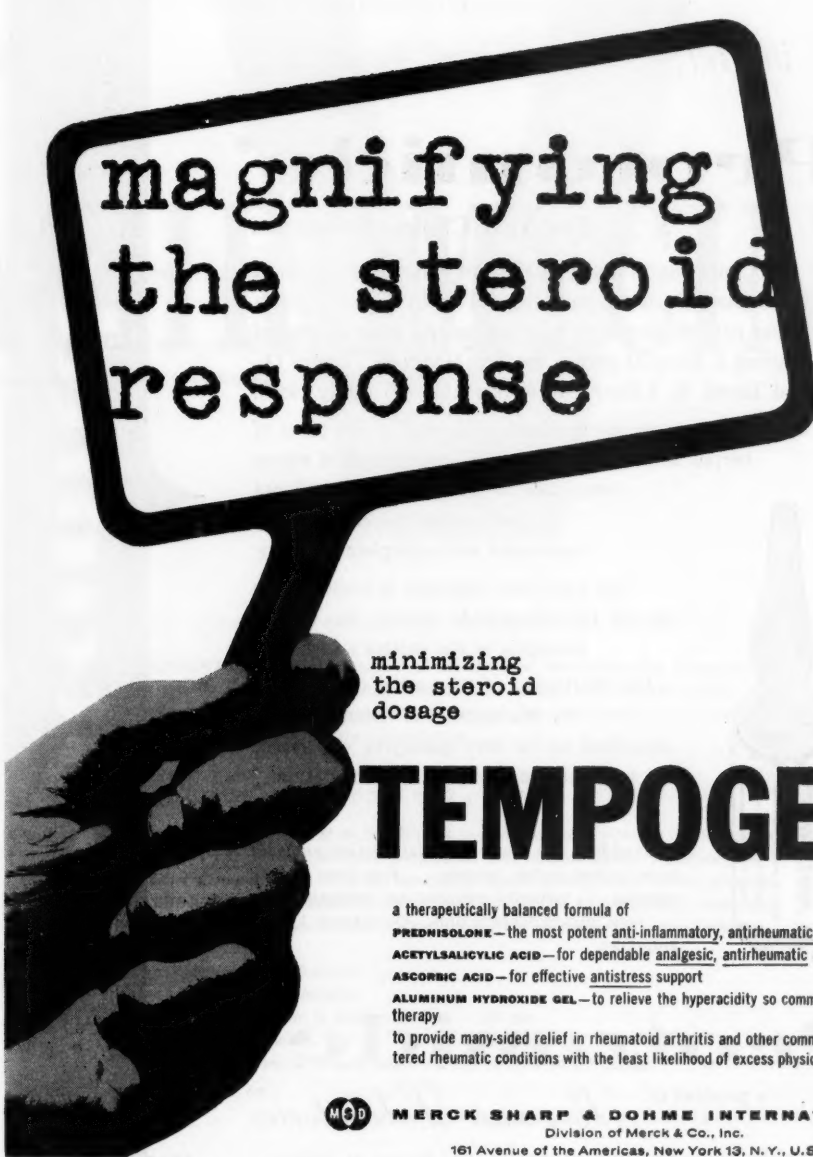
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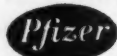


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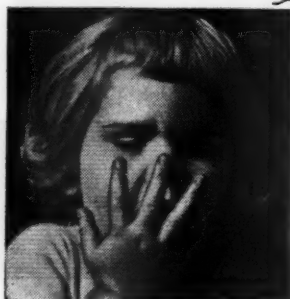
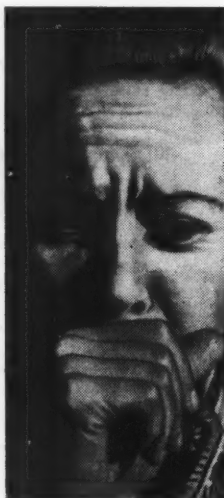
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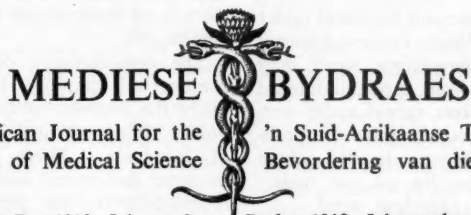
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No. 11

REDAKSIONEEL · EDITORIAL

VOORKOMING VAN BLINDHEID BY DIE BANTOES

Blindheid ten gevolge van infeksie kan vandag byna geheel en al voorkom word. Die groot aantal blindes wat onder die Bantoes in Suid-Afrika aangetref word, is derhalwe 'n droewige kommentaar op ons profilaktiese pogings, die ondoeltreffendheid waarvan ook baie duidelik aangetoon word deur die regstreekse, berekenbare koste van blindheid. Dit bedra teen hierdie tyd ongeveer £700,000 per jaar, en dié geld word bestee aan die opvoeding van blindes, die subsidiëring van beskutte werkskemas, en die betaling van pensioene aan die blindes van alle rasse in die Unie.

Die voorkoms van blindheid onder naturelle is verontrustend hoog. Sorsby se *globale* syfer vir die naturelle in hierdie land¹ is 351 per 100,000. Hierdie syfer is egter nie 'n juiste weerspieëling van die afskrikwekkende toestand in sommige streke nie. Nietemin is dit onrusbarend genoeg as dit vergelyk word met die kleurlingsyfer van 211 en die blanke syfer van 91 per 100,000. Die werklike omvang van die probleem word duidelik aan die lig gebring in die verslae wat van tyd tot tyd deur die Buro vir die Voorkoming van Blindheid² uitgereik is. Een opname het, byvoorbeeld, aangetoon dat daar 800 blindes per 100,000 siele in Sekoekoenieland, en 1,700 per 100,000 van die bevolking in die gebied Maandagshoek-Penge is. In die naturellegebiede in Potgietersrus het 'n opname wat in 1948 gedoen is, aan-

PREVENTION OF BLINDNESS IN THE BANTU

Blindness from infection is to-day almost wholly preventable. The high blindness rate among the South African Bantu is therefore a sad commentary on our prophylactic efforts, the inadequacy of which is reflected also in the direct, calculable cost of blindness. This is by now already some £700,000 a year, the money being spent to educate, to subsidize sheltered employment and to provide pensions for the blind of all races in the Union.

The incidence of blindness is disturbingly high amongst Africans. Sorsby's *overall* rate for Africans in this country¹ is 351 per 100,000. This figure does not reflect the appalling situation in many regions. Nevertheless it provides an alarming enough comparison with the Coloured rate of 211 and the European rate of 91 per 100,000. The real magnitude of the problem is disclosed in the reports issued from time to time by the Bureau for the Prevention of Blindness.² Thus we find, as a result of one survey, an incidence of 800 per 100,000 in Sekukuniland and of 1,700 per 100,000 in the Maandagshoek-Penge area. In the Potgietersrust Native areas, another survey in 1948 actually revealed an incidence of 2,000 per 100,000.

Medical opinion differs about the precise causes of blindness among the Bantu. Some practitioners attach considerable and primary importance to malnutrition, whereas other

1. Sorsby, A. (1950): Brit. J. Ophthalmol., Supp., XIV.

2. Verslae van die Buro vir die Voorkoming van Blindheid, 1948, 1951. Pretoria.

1. Sorsby, A. (1950): Brit. J. Ophthalmol., Supp., XIV.

2. Reports of the Bureau for the Prevention of Blindness, 1948, 1951. Pretoria.

getoon dat 2,000 uit elke 100,000 van die bevolking blind is.

Oor die eintlike oorsake van blindheid onder die Bantoes word verskillende mediese menings daarop nagehou. Ondervoeding word deur sommige geneeshere as van groot, inderdaad van primêre belang beskou, terwyl ander werkers met praktiese ondervinding van die probleem weer met getuïenis voor die dag gekom het wat daarop dui dat die rol van ondervoeding veels te hoog aangeslaan word.

Die demonstrasie van insluitingsliggaampies in oogbindvieskraapsels³ het die bestaan van trachoom bo alle twyfel bewys, en dit is 'n bekende feit dat trachoom 'n belangrike oorsaak van blindheid is. Daar is ook heelwat getuïenis wat daarop dui dat gemengde infeksies heelwat tot die voorkoms van blindheid bydra. Hierdie feite moet uit die aard van die saak 'n invloed op die aanvalsmetode uitoefen.

Elders in hierdie uitgawe publiseer ons 'n belangrike voorlopige verslag oor 'n veldproefneming wat namens die Buro vir die Voorkoming van Blindheid deur dr. J. Graham Scott en dr. I. B. Taylor onderneem is. Die resultate daarvan toon duidelik aan hoe dramaties die voorkoms van trachoom met behulp van antibiotiese salwe verminder kan word. Hierdie verslag is die voorloper van 'n skema in hierdie land vir die massa-voorkoming van blindheid onder reusagtige seksies van die bevolking; en die gevolgtrekkings in daardie verslag oor die terapeutiese reaksie op die antibiotica laat 'n kritiese lig op die ondervoedings-teorie val.

'n Interessante kenmerk van die Scott-Taylor-verslag is die bewese uitvoerbaarheid van 'n skema waarvolgens skoolkinders geleer word nie alleen om hulself te help nie, maar ook om andere wat nog nie die skoolgaande leeftyd bereik het nie, te behandel. Die opvallende welslae waarmee die voorlopige skema bekroon is, regverdig die uitbreiding van die werk na alle gebiede waar trachoom aangetref word.

Die geduldige, beskeie en vërsiende werk van die Nasionale Raad vir Blindes en sy Buro vir die Voorkoming van Blindheid in Suid-Afrika het veel gedoen om 'n doeltreffende skema vir die voorkoming van blindheid die lig te laat sien. Die Nasionale Raad en die Buro is inderdaad 'n reeds fungerende rganisasioe wat die werk waaroor verslag in hierdie uitgawe gedoen word, kan onderneem en uitbrei. Trouens, dit skyn asof dit die geskikste organisasie is om die werk van die Uniegesondheidsdepartement op hierdie besonder gebied aan te vul, want in die Nasionale Raad en sy Buro is daar gedistingeerde deskundiges wat eerstehandse kennis van die probleem en die oplossing daarvan opgedoen het. Hul

workers with practical experience in the field have produced evidence which suggests that the role of malnutrition has been grossly over-emphasized.

The demonstration of inclusion bodies in conjunctival scrapings³ has established beyond doubt the existence of trachoma, and it is well known that trachoma is an important cause of blindness. There is also considerable evidence that mixed infections contribute very considerably to the production of blindness. These facts must clearly influence the line of attack.

Elsewhere in this issue we publish an important preliminary report of a field experiment undertaken on behalf of the Bureau for the Prevention of Blindness by Dr. J. Graham Scott and Dr. I. B. Taylor. The results indicate strikingly the dramatic way in which the incidence of trachoma can be reduced with antibiotic ointments. This report pioneers a scheme in this country for the mass prevention of blindness in vast sections of the population; and its conclusions on the therapeutic response to antibiotics bring the malnutritional theory under critical review.

An interesting feature of the Scott-Taylor report is the proved practicability of a scheme whereby schoolchildren learn not only to help themselves, but also to treat others who are not school-going. The striking success of the pilot scheme justifies an extension of the work to all areas where trachoma is known to exist.

The patient, unassuming and far-sighted work of the National Council for the Blind and its Bureau for the Prevention of Blindness in South Africa has done much to evolve an effective scheme for the prevention of blindness. In the National Council and in the Bureau we have, in fact, a ready-made organization for undertaking and extending the work reported on in this issue. Indeed, this would seem a most suitable organization for supplementing the work of the Union Health Department in this field, since, in the National Council and in its Bureau, distinguished experts are available who have acquired first-hand knowledge of the problem and its solution. Their knowledge and skill are available for the guidance of schemes in other parts of the country. A relatively modest support from public funds would enable the Bureau to proceed with its valuable preventive work on the scale necessary to cope

3. Amies, C. R., Murray, N. L., Scott, J. Graham and Warren, R. St. H. (1952): S.-Afr. Tydskr. Geneesk., 26, 367.

3. Amies, C. R., Murray, N. L., Scott, J. Graham and Warren, R. St. H. (1952): S. Afr. Med. J., 26, 367.

kennis en vernuf is beskikbaar om skemas in ander dele van die land van stapel te stuur. Betreklik matige steun uit staatsfondse sal die Buro in staat stel om voort te gaan met sy waardevolle preventiewe werk op die skaal wat nodig is vir die oplossing van 'n probleem wat reeds 'n verontrustende omvang aangeneem het.

Die voorkoming van oftalmie—hoe dit ook al veroorsaak word—is 'n openbare plig. 'n Profilaktiese program sal betreklik min kos, en heelwat van die geld bespaar wat vandag aan pensioene vir blindes bestee word. Die verlies van arbeidskrag vir sover dit ons handel en nywerhede, en die naturelle self in hul eie stamgebiede betref, is ook 'n saak wat groot besorgdheid wek. As mediese praktisyns beskou ons die probleem egter nie geheel en al uit 'n suiwer ekonomiese oogpunt nie. Daar is die ellende van 'n lewe in die duisternis vir diene wat nie blind hoef te geword het nie, en al die huislike tragedieë wat sulke rampe onvermydelik met hulle meebring. Vandag lê dit binne ons vermoë om al hierdie dinge te voorkom.

with a problem which has already assumed alarming proportions.

The prevention of ophthalmia, from whatever cause, is a public duty. A prophylactic programme will cost relatively little and save much of the expenditure now devoted to pensions for the blind. The loss of manpower to commerce and industry, and to the African peoples themselves in their own tribal areas, is also a matter of grave concern. As medical practitioners, however, we do not look upon the problem entirely in terms of economics. There is the misery of a life in darkness for those who need not have been blinded, with the domestic tragedies which such disasters inevitably carry in their wake. All this it is to-day in our power to prevent.

PREVENTION AND CURE OF TRACHOMA

A PRELIMINARY REPORT

J. GRAHAM SCOTT,* M.D., D.O.M.S. (R.C.P. & S.)

and

I. B. TAYLOR,† F.R.C.S., D.O.M.S. (R.C.P. & S.)

Johannesburg

Trachoma affects 70% of Bantu babies in most rural areas in the Northern Transvaal and leads to much blindness in later life.

Recent field trials organized by the Bureau for the Prevention of Blindness in South Africa encourage the view that infection can be prevented and cured.

As a similar problem occurs among the Cape Coloureds and in the Rhodesias and Bechuanaland, this interim report is presented to stimulate interest in other centres.

BACKGROUND TO THE PLAN OF TREATMENT

The incidence of trachoma in age groups is shown in Fig. 1. The highest rate of infection is in early childhood. The incidence diminishes with age. The facts suggest that there is a natural tendency to heal (which explain why so little trachoma is seen in mine workers) and that blindness will result from entropion and corneal scarring in the unhealed group.

* Member, WHO Expert Advisory Panel on Trachoma.

† Member, Bureau for the Prevention of Blindness in South Africa.

The initial infection is a mixed one of Koch-Weeks bacillus with *Chlamydozoon trachomatis*. This seldom occurs before 3 months of age.

It is not certain whether antibiotic ophthalmic ointments affect trachoma directly or whether they encourage the natural healing of that disease by keeping the eye free from bacterial infection. Similarly, it is not certain whether they can prevent infection with the *Chlamydozoon* or whether, by preventing bacterial infection, they minimize the severity of a trachoma attack.

FIRST FIELD TRIAL

In 1955 it was decided to conduct a field trial by treating the eyes of all babies and children in a Native area with antibiotic ointment 3 times daily during the hot, fly-infested months of October to January. This experiment was a failure because the mothers could not bring their children to the centres for treatment. The World Health Organization (which conducted similar field trials in North Africa) reported in 1956:

1. Antibiotic ointment twice a day for 3 days

each month was as effective as when used daily throughout the month and

2. Topical antibiotic ointment was nearly as effective alone as when combined with sulpha drugs systemically.

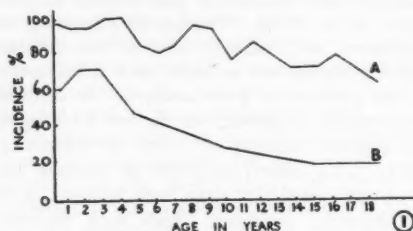


Fig. 1. Incidence of trachoma in age groups.
A: Incidence in a heavily infected area.
B: Incidence in an average area.

Two modified plans were therefore started in 1956, the first in a Native reserve and the second in a nearby location where the workers and their families were under supervision.

The difficulties we encountered are typical of what can be expected in future campaigns in Native reserves. Four areas were surveyed in 1955, one of which was intended as a control. As in the first year the mothers would not bring their babies for treatment, Chloromycetin 1% Ophthalmic Ointment was issued in September 1956 to the schools. The children treated each other and took the ointment home to treat their younger brothers and sisters for 3 days in each month.

The control area managed to obtain ointment in the first year and insisted on having official treatment in the second year, when they reduced the incidence from 86 in 105 (82%) to 24 in 75 (32%).

Four new control areas were surveyed (sufficiently far away to remain as controls). The incidence in these new areas was the expected one of 70%.

In the 3 treated areas treatment was stopped at Vaaltyn because the school in that area closed down. The few children who came for examination were in much the same state as in 1955. At Mapela no children came for examination. At Vaalkop the incidence fell from 429 in 687 (63%) to 8 in 20 (40%) in the under 5 group. It was 74 in 287 (26%) in the school children.

SECOND FIELD TRIAL

Achromycin 1% Ophthalmic Ointment was instilled twice daily for 3 days a month into the

eyes of 301 children living in different compounds. The children in one compound, who were not treated, constituted a control group. The overall rate of infection was 76%.

This trial was started in March 1956 by Dr W. Harris. Unfortunately, he left the country and the supply of ointment ran out. The trial therefore lapsed and was restarted in about September, using Aureomycin Ointment with Sulphatriad by mouth. After a few months, this treatment also lapsed and was replaced by 4% copper sulphate drops.

When we examined the younger children in March 1957, the incidence of trachoma was 22 in 323 (7%) in the treated area and 20 in 39 (51%) in the untreated area. The reduction from 76% to 7% in one year with such irregular treatment is most encouraging. The reduction from 76% to 51% in the control area can be explained by the fact that an anti-fly and a face-washing campaign was started in all compounds in March 1956.

Allowance must also be made for the fact that no two workers will agree exactly on the diagnosis and therefore the incidence of trachoma; but we feel that the greater reduction in the treated area compared with the untreated area in one year is more than fortuitous and indicates that trachoma can be prevented and cured by simple methods.

It is suspected that the greater reduction of trachoma in the second field trial was due to the thoroughness of the treatment (while it was being done) rather than to the method. There are also reasons against using sulphonamides systemically:

1. They may upset a border-line nutrition.
2. They may set up drug resistance.
3. They are too dangerous for issue to school children.

Further trials will determine what is the best form and duration of treatment. No resistance has developed to the antibiotics used. The figures are based on examination of children under 5 (except where stated), but it is not easy to arrange in advance for mothers to bring their babies to a centre for examination. Sometimes only 20 come and sometimes 600. Our figures, therefore, are not always adequate for statistical purposes, but they do support our clinical impressions:

1. That there was less trachoma in the areas than before.
2. That the severity of infection was reduced.

CONCLUSIONS

1. The trials encourage us to believe that the incidence and severity of trachoma can be

minimized by simple treatment.

2. In the absence of a better method, treatment can be carried out by school children on themselves and on others not at school.

3. The treatment consists of an application of antibiotic ointment twice a day for 3 days a month during school terms, for at least a year.

4. To prevent a recurrence of the disease after treatment has stopped, it is important to treat every young child in the area.

OPSOMMING

1. Veldproefnemings sterk die geloof dat die voorkoms en die erns van trachoom deur eenvoudige behandeling tot 'n minimum beperk kan word.

2. By ontstentenis aan 'n beter metode kan die behandeling toegepas word deur skoolkinders op

hulself en op andere wat nog nie op skool is nie.

3. Die behandeling bestaan uit die aanwending van 'n antibiotikum twee maal per dag op 3 dae van elke maand van die skoolkwartaal gedurende 'n tydperk van ten minste 'n jaar.

4. Om die weerverskyning van die siekte te voorkom nadat die behandeling gestaak is, is dit van belang dat elke kind in die betrokke gebied behandel moet word.

We are grateful to Parke, Davis Laboratories (Pty.) Ltd. for donating supplies of Chloromycetin Ophthalmic Ointment and to Lederle Laboratories for supplies of Achromycin Ophthalmic Ointment to start the trials.

We are indebted to the Bureau for the Prevention of Blindness in South Africa for permission to submit this Interim Report for publication.

We wish to thank the South African Institute for Medical Research for help with laboratory investigations.

IMPLANTATION OF RADON SEEDS INTO THE PITUITARY FOSSA IN THE TREATMENT OF SECONDARY DEPOSITS FROM CANCER OF THE BREAST A PRELIMINARY REPORT

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Radium emanation has been used since the discovery of radium for the treatment of malignant conditions. At first radon was used in glass capsules, but the caustic action of the beta rays given off by the radon led to the introduction of metal filters, e.g. gold, silver and platinum. These cut out most of the beta rays, thus permitting the use of the more penetrating gamma rays.

Radon has a half-life of 3.8 days only. As it results from radium disintegration, it is relatively cheap. It has the advantage that it can be permanently implanted, as very small seeds, into tumours where radium needles could not be used easily or at all. Radon also does not need a second operation for its removal, since it is generally inserted as a permanent implant, although it can be used as a temporary implant like radium by attaching light threads to the seeds.¹ In the pituitary it is used as a permanent implant.

Although radon has been used in America and England for many years, its short half-life

made it impractical in South Africa until the introduction of the fast aeroplane service between England and this country. One of us (M. W.), after visits to Amersham in 1949 and 1950, arranged for the shipment of radon to South Africa by air in special containers to allow for adequate protection of personnel and goods on board. Subsequently, the introduction by the C.S.I.R. of the wing-tip method of transporting isotopes and radon simplified the matter and reduced transport expenses.

Radon implantation into the pituitary is not new. It was carried out by Northfield² in 1949. He refers to early attempts by several workers as long ago as 1936. Northfield implanted radon, not through the sphenoid but through a lateral or frontal approach, for conditions such as Cushing's disease and acromegaly. Although he obtained a good result in one instance, the side effects were marked and several patients died. Some of the side effects were very alarming and it is remarkable that none of them has been observed in the cases,

so far reported, treated by the sphenoidal route for secondary deposits from breast carcinoma. The explanation may be that in the mammary carcinoma cases the pituitaries were normal, whereas in Northfield's cases they were pathological.

The dependence of breast and prostate neoplasms on hormonal factors has been known for some 60 years and attempts have been made at various times to remove these hormonal influences. Sterilization for carcinoma of the breast in women has been advised and practised for many years as a prophylactic measure, although in some series this did not lead to any statistical difference in the development of secondary carcinomatous deposits.³ The effect, however, of sterilization (surgical, radiation or endocrine) on secondary deposits from the breast after they have developed cannot be doubted. The effect of castration on carcinoma of the prostate has also been demonstrated and is an acceptable procedure.

Radiological or surgical sterilization, i.e. removal of ovarian function, was not invariably successful in controlling secondary deposits, even temporarily. It was then demonstrated by Woolley⁴ (1950) that the adrenal cortex secretes steroid ovarian hormones which make up for the deficiency after the ovaries are functionless. Moreover, the ovaries may continue to have an active endocrine function in some cases after the menopause [Huggins and Dao (quoted by Cade 1955^{6a})]. This led to the operation of bilateral adrenalectomy with the removal of the ovaries.⁵ The operation was taken up in England by Cade^{6, 6a} and is now being practised in America and Europe. Bilateral adrenalectomy, while giving good results in some cases^{6a} (about 60%), was ineffective in many others and the difficulty was to determine beforehand which of the cases were endocrine-dependent. As the removal of the ovaries and bilateral adrenalectomy did not stop all hormone production, the next step was the removal of the pituitary gland itself or, more recently, the cutting of the pituitary stalk.⁷ They removed the pituitary for a number of conditions other than breast and prostate carcinoma, e.g. Cushing's syndrome, malignant hypertension, diabetes mellitus, chorionepithelioma and malignant melanomata; but the only worthwhile results obtained were for secondary deposits from carcinoma of the breast. The removal of the pituitary must be as complete as possible. Olivecrona insists that it must be complete, and in those cases where haemorrhage has prevented the complete in-

spection of the pituitary, he has packed the pituitary fossa with some sclerosing solution and then re-operated several days later; yet the operation did not give more than about 40% results in the relatively few cases he had done.

The point which obviously arises is whether these extensive operations are justified for patients who have very extensive secondary deposits and whose lives must be limited in any case, particularly as a favourable result can only be obtained in some 60% of cases. While it is true that the results may be dramatic when they are obtained^{6a} (Cade, 23%) there is this difficulty of not knowing beforehand when the result will be satisfactory. As far as we know, there have been no records of patients treated by bilateral adrenalectomy or hypophysectomy in the hope of delaying the formation or onset of secondary deposits. Tests for hormone dependency in mammary or prostatic cancer have been described,¹⁵ but they are not easy to carry out and may aggravate the symptoms. The scheme hitherto has been to treat secondary deposits when they arise by radiotherapy and with hormones; and when they can no longer be controlled and become too extensive, to do a bilateral adrenalectomy and oophorectomy or hypophysectomy. Hence all the cases treated have been late cases with very extensive deposits. As the treatment by bilateral adrenalectomy and hypophysectomy carries a considerable mortality and is uncertain in its effect, Forrest and Peebles Brown⁸ described a method of destroying the pituitary by implanting radon seeds directly through the sphenoid.

They designed special apparatus for radiographic control of the cannula and trocar (in two planes) directed via the nose through the sphenoid into the pituitary through the floor of the fossa. The director is guided by markers on the apparatus very similar to the marker used in some types of apparatus for the insertion of Smith-Petersen pins into the necks and heads of femora.

Fig. 1 is a photograph for which we are indebted to Dr. Peter Kerley of the Westminster Hospital. It shows the patient's head and the guides for the insertion of the cannulae and trocars. The depth of the pituitary is only about 1 cm. and as radon seeds are 0.5 cm. long, the insertion of these seeds into the anterior portion of the pituitary requires very accurate radiographic control. It is this radiographic control which in some instances has made the operation a relatively lengthy procedure. If there is some obstruction in the nose

which deflects the cannula, then more films must be taken to obtain the correct direction. As the processing of each set of films takes 5-10 minutes with the usual solutions, considerable time may be spent in the implantation of the radon. With a fast developer and fixer we have reduced the time to 2 minutes or less per set of films.

To save time the Royal Marsden Hospital uses a biplane screen intensifier which enables accurate implantation of the seeds without taking films. We have tried to save time and films by screening the position of the trocar as it approaches the pituitary. There is, however, considerable difficulty in doing this with routine portable apparatus which is used for the lateral views because of the amount of radiation the patient and the observer get in the process of screening. Screening does, however, cut down the number of films and the time of the operation.

We have followed the technique advised by Forrest and Peebles Brown; it is described below.

We have done our cases in an X-ray department with the dark room next to the radiographic room, as this cuts down the time necessary to process the films.

No case of sepsis from the procedure has been reported in the literature nor have we had any sign of infection in our cases.

DESCRIPTION OF APPARATUS

It will be observed from Fig. 2 that the markers on the one side (shown in the lateral films) indicate whether the trocar is advancing in the right direction towards the pituitary. A group of markers on the patient's forehead (Fig. 3) directs the trocar in the horizontal plane. The platform (B in Fig. 1) is arranged by means of the metal holders at the sides (A in Fig. 1), so that it is horizontal when resting on the patient's forehead. The clamps at the back (C in Fig. 1) immobilize the apparatus and the patient.

It is an advantage to graduate the apparatus so as to correlate the movement of the controlling screws (at the side and above the apparatus) in the two planes. This makes it easier to advance the cannula and trocar by 1-2 mm. when necessary.

The magnification factors are calculated and plotted graphically so that the distances measured on the films can indicate adjustments of the depth of the trocars accurately and rapidly.

The actual steps in the technique are as follows:

Under general anaesthesia (with an intratracheal tube) the pharynx is packed off. The patient's nose is swabbed with spirits and a solution of 1:1,000 adrenaline. (The amount of bleeding we have had in our cases has been negligible).

The platform is then adjusted on the patient's forehead. The director tube is inserted through the apparatus into the patient's nose. The cannula is inserted through the director tube and pushed for-

ward as far as possible. At this stage we take our first set of films to indicate whether the cannula is going in the right direction (Fig. 4).

The trocar is next inserted through the cannula and advanced either until obstruction is met at the sphenoid (Fig. 5) or the distance determined by the stop is reached. At this stage another set of films is taken both in the Towne's* (Fig. 6) and lateral projections (Fig. 7). The trocar is then pushed through the sphenoid for a measured distance until the resistance of the floor of the pituitary fossa is reached. A further set of films shows whether the trocar is in the right direction, and whether it has reached the required part of the pituitary (Figs. 8A, 8B). If the trocar strikes the middle portion of the floor of the pituitary fossa, an attempt to penetrate the floor may deviate the trocar posteriorly along the curved inferior surface of the fossa (Fig. 8A). The trocar should be directed towards the anterior portion of the pituitary (Fig. 2). When in the correct position, the trocar is advanced 1-4 mm. into the fossa (Fig. 9).

A nasal obstruction may deviate the trocar laterally (Figs. 6 and 10). Even the heaviest trocar supplied may be deviated, and an attempt may have to be made to avoid the obstruction by going through the other nostril. We have taken films after the insertion of each radon seed (5 mcs.) to show that they are well distributed in the pituitary (Figs. 11-13). As with every other procedure, the more often one does it, the quicker the operation becomes.

Before doing our first patient two of us (H. J. and M. W.), through the kindness of Prof. R. A. Dart, were able to practise on a cadaver. We learnt some very valuable practical points:

1. A stop was required on the heavy trocar because of the risk of going too far when pushing the trocar through the floor of the pituitary fossa. The trocar might go through the diaphragm and into the brain. The provision of a stop and accurate estimation of the length of the trocar to be used prevents this.

2. It is essential to take films after the introduction of every seed, because if the trocar and cannula slip out, the seed might be deposited in the sphenoid sinus or the seed may be withdrawn into the cannula as the trocar is removed, probably due to the Vaseline on the trocar.

It took us some 4 hours of practice to get the seeds into the right position in the cadaver, after taking numerous films.

We have done an implant in 75 minutes. With the number of films one has to take it is unlikely that the procedure could be done in less than 45-60 minutes.

Our patients were not inconvenienced by the operation. The only complaints were a feeling of pressure at the vertex of the head for a day or two in several cases, and some stiffness of the neck due to the position of the head during the operation.

* The original apparatus has been modified to obtain a Towne's instead of an antero-posterior view, as this gives greater accuracy.

There was no rise in temperature and no sign of infection. The patients were kept on antibiotics for the first two days. Cortisone equivalent to 25 mg. daily was started two days before the operation and continued subsequently. It is not possible or reasonable to attempt to give an opinion on the value of the method merely from the few cases we have done, particularly as all the cases had advanced numerous secondary deposits. There were no distressing side effects.

It is a striking commentary on even present-day conditions that 3 of the patients had had the breast carcinoma untreated for some 4-5 years and were riddled with secondary deposits.

Forrest and Brown published a second paper⁹ reporting on 25 cases of advanced cancer treated by this method. All the cases had extensive metastatic spread to the lymph nodes, bones, lungs and, in one case, the brain. All of them had had surgery or radiotherapy. Some had had hormone treatment as well. One had had a bilateral adrenalectomy without success and in this case the pituitary implantation reduced the 17-ketosteroid so rapidly (although it had been unaffected by the previous adrenalectomy) that they felt it was justified in the remainder of these cases to perform pituitary radon implantations without previous adrenalectomy. Forrest and Brown feel that the gamma rays from the radium (the dose they use is 15 to 20 mcs.) completely destroy the pituitary.

Since their first paper they have made several modifications. Thus originally 10 mcs. were implanted, but now they use 15 and in some cases 20 mcs. More recently they have used two cannulae, one for each nostril, and inserted 8 mcs. through each nostril.

They have had no operative mortality and neither infective complication nor rhinorrhoea has developed. The only serious complication has been that in 4 cases defects in one visual field appeared 1-4 months after the implant, from damage to the optic tract. This has resulted in the loss of vision in one eye in 3 cases and blindness in the fourth case. They suggest that the injury to the visual tract was due to anatomical variations in the position of the optic chiasma.

Cortisone has had to be given in 25 mg. doses daily, otherwise the typical cortisone withdrawal syndrome developed, e.g. anorexia, vomiting, lassitude and extreme weakness. Hypothyroidism may develop at a later date. Diabetes insipidus developed in their cases a few weeks after the implantation. They report

some good results in cases with extensive skeletal deposits and even in cases with pulmonary deposits. Bone metastases have recalcified and ulcerating nodules in a mastectomy scar have healed.

Radio-active gold seeds (which are beta emitters) are being used at the Royal Marsden Hospital to avoid damage to the optic tracts.

Greening, of the Royal Marsden Hospital, recently stated¹⁰ that in 80 bilateral adrenalectomies the operative mortality was 6%, a figure which is comparable with that reported by Huggins¹¹ and by Cade.⁶ The Royal Marsden Hospital thus does not consider adrenalectomy justifiable unless it promises a clear remission of the disease with complete alleviation of the pain for at least a year. They have obtained this remission in only 35% of cases.

In hypophysectomy the successful results are probably 50%, but the mortality is 5%. They have consequently treated these secondary deposits from the breast by implanting unscreened radio-active gold seeds into the anterior part of the pituitary, again via the nose and the sphenoidal sinuses. They have treated 50 patients this way and have no mortality, major complications or evidence of damage to the optic chiasma. They, too, have not had cases of cerebrospinal rhinorrhoea following the implantation. The complete assessment of their cases, however, is not yet available.

Another method of pituitary ablation for secondary cancer was reported by Davies of the Middlesex Hospital.¹² He draws attention to the work of Rothenberg *et al.*¹³ Davies objects to the intra-nasal route because of the risk of infection. None of the cases reported by Forrest or by Greening showed any such infection. He also feels that by using a fluid isotope, presumably gold, and by the added accuracy obtainable by exposing the pituitary gland, there is less risk to the optic chiasma. Davies' method is an open operation. He does not give any indication of the results so far obtained.

The infiltration of growths with radio-active gold solution has been carried out in a number of cancers, particularly the prostate. Experience has shown that there is some risk (with the use of these liquid isotopes) of injury to the rectum through leakage, e.g. when treating the prostate, there was a considerable percentage of rectal ulcers caused by the leakage of the radio-active gold solution.¹⁴

Because of the risk of leakage and because Davies' method is an open operation, we feel

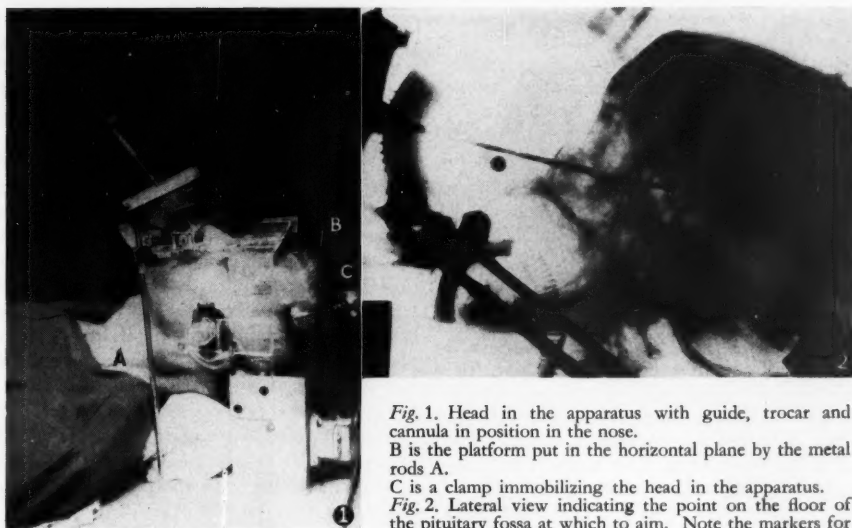


Fig. 1. Head in the apparatus with guide, trocar and cannula in position in the nose.

B is the platform put in the horizontal plane by the metal rods A.

C is a clamp immobilizing the head in the apparatus.

Fig. 2. Lateral view indicating the point on the floor of the pituitary fossa at which to aim. Note the markers for obtaining the correct angle.

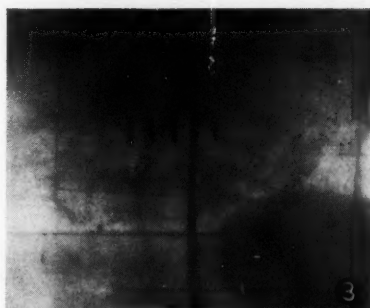
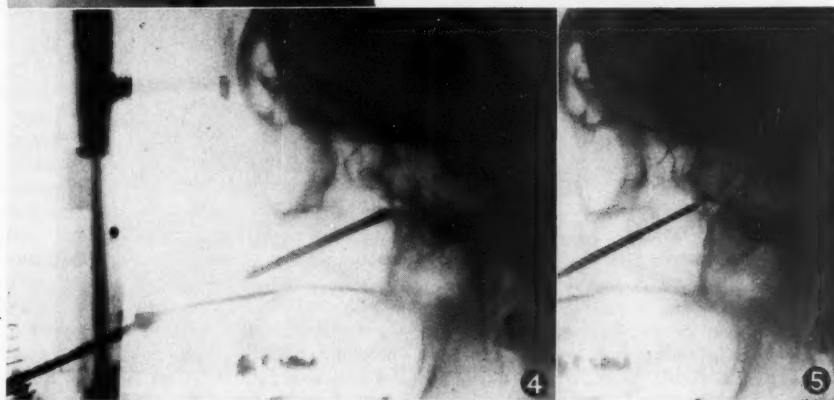


Fig. 3. Metal markers on the forehead to guide the trocar in relation to the coronal plane. Note that the trocar has been deviated by an obstruction in the nose.

Fig. 4. Cannula in position, but at the wrong angle, which must be altered.

Fig. 5. Trocar in contact with the sphenoid.



that the insertion of radio-active gold seeds or radon through the nasal route is preferable at

this stage. When enough cases have been done with the various methods, it will be possible to

decide which method will be better.

The disadvantage of using radio-active gold in South Africa is that it has a shorter half-life than radon. If, for some reason, the aeroplane is delayed, there might be some difficulty. One can always get over this by ordering seeds which are stronger than the amount actually required. As the radio-active gold seeds, however, have been reported to be safer as far as vision is concerned, we propose to adopt the implantation of radio-active gold seeds in some of our cases. The same apparatus can be used without modification.

Other isotopes which have been suggested are yttrium (with a half-life of 65 hours) and chromic phosphate (which would have the same half-life as radio-active phosphorus, i.e. 14 days). Various other radio-active isotopes will no doubt be used by workers overseas, but until sufficient numbers have been treated and the results published, it is obviously not possible to tell which method or substance will

give the best result. On first principles, as it avoids risk due to leakage and as it is much easier to control dosage, the radio-active gold seeds would be preferable to liquid radio-active gold particularly as this requires an open operation.

It is not possible to judge the value of the procedure from the 5 cases we have implanted, particularly as they were all in the terminal stages with innumerable secondary deposits. The fact, however, that even in Case 5 with such very extensive disease, there was relief from pain within 24 hours after the implantation of the radon and the fact that the implantations caused so very little disturbance and so few side effects, would indicate that it is well worth while persevering with this method of treatment and that less extensively involved cases than those we have so far treated should be given the benefit of implantation.

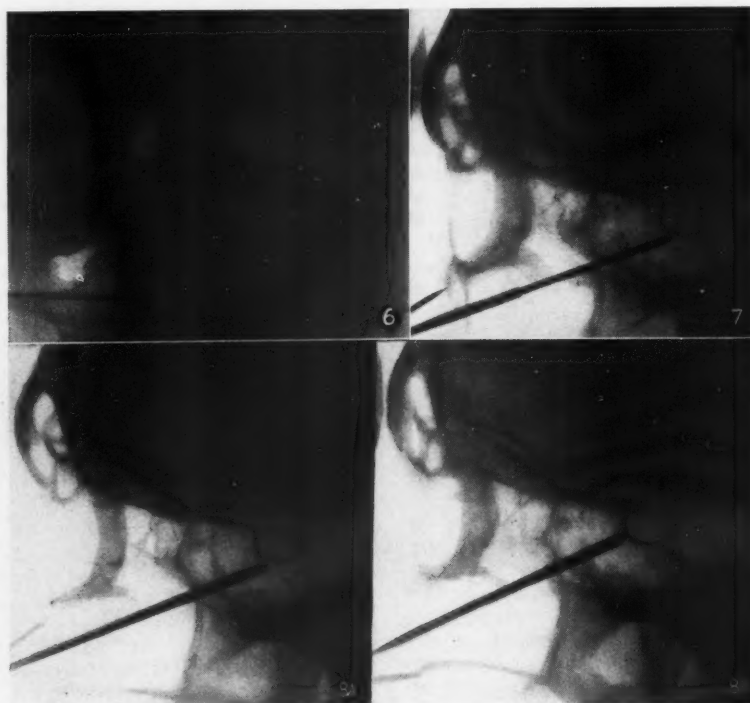


Fig. 6. Marked deviation of the trocar by a nasal obstruction.

Fig. 7. Trocar deviated onto the wrong point on the floor of the pituitary fossa.

Fig. 8a. A heavier trocar also deviated on the curved floor of the fossa.

Fig. 8b. The trocar replaced in a satisfactory position.

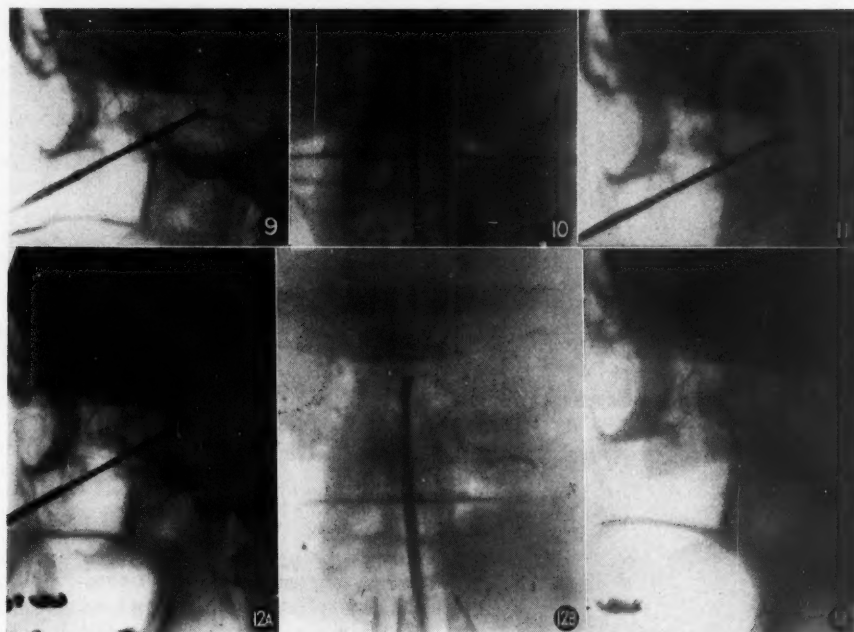


Fig. 9. Trocar and cannula have pierced the floor of the fossa for implantation of the first seed.

Fig. 10. Trocar and cannula in A—P view.

Fig. 11. The first seed implanted. It has moved into a horizontal position.

Fig. 12a. Two seeds in the pituitary.

Fig. 12b. The 2 seeds can be seen just beyond the cannula (A—P view).

Fig. 13. The 3 seeds within the pituitary.

The following are the brief histories of the patients we have so far treated:

CASE 1

Mrs. I. B. M., aged 48, was first seen by M. W. in 1954. Her history then showed that she had had a lump in the right breast for 5 years but had not reported it to any doctor. For the previous 6-7 months she had had a pain in the lower back for which she had been given physiotherapy, as it had been diagnosed as fibrositis. Since then the pain had been intermittent. For the previous week, she had severe pain in the lower lumbar spine radiating down both thighs posteriorly.

The right breast was fixed and ulcerated and there was a chain of glands extending into the axilla. X-ray examination showed numerous secondary deposits in the skull, pelvis, the left acetabulum, the left ischio-pubic junction, the right ischio-pubic junction and multiple secondaries in all the lumbar vertebrae and ribs (Fig. 14).

The various secondary deposits were treated by X-rays and with hormones. She made remarkably good progress in that some of the secondary deposits calcified and for long periods she lost her pain completely. A radium implant was done into the ulcerated right breast and the ulcers healed up. (Fig. 14C). She kept amazingly free from symptoms for a year, until May 1955, when she developed secondary deposits in the vertex of the skull. These were also treated with X-rays. Her symptoms were relieved and she became free from pain. She walked quite well. She had also been given a course of testosterone.

Relapses occurred at intervals which necessitated X-ray treatment. In April 1956 numerous nodules developed on her forehead and in the right parietal region. There were also secondary deposits in the 5th, 6th and 7th cervical vertebrae. The transverse process on the left side of C7 was completely destroyed.

In view of the fact that it had become impossible to keep up with the 'chasing' tech-

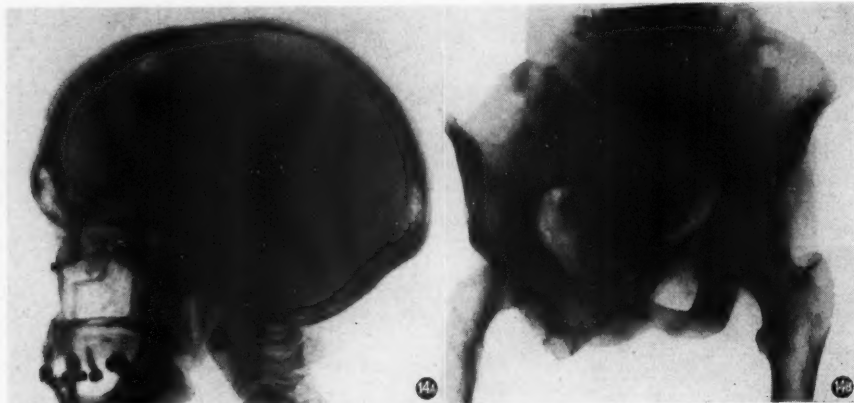


Fig. 14a. Case 1: Secondary deposits in the skull.

Fig. 14b. Case 1: Extensive secondary deposits in the pelvis.

Fig. 14c. Case 1: Radium implant of the ulcerated carcinoma of the breast.



larly as the pituitary fossa, as seen from the figures, was small, and the curved shape of the floor of the pituitary fossa deflected the trocar.

In spite of the poor general condition of the patient (she had had several pints of fluid removed from the left chest only 2 or 3 days before) she stood up to the implantation extremely well. The morning after the implantation she sat up in bed and had breakfast. The only symptom was a numb feeling at the top of the head and over both parietal regions at the points where the head-rests had made contact with her head. She stated she felt very well and that already she felt less pain in the left hip joint region. At the time of the implantation the patient was riddled with secondary deposits in the skull, the pelvis, the lumbar vertebrae, the left femur and the lungs. She also had secondary deposits in both axillae. There was a small mass in the left breast.

She was put on Achromycin and she only had a slight rise in temperature 24 hours after the implantation. At 48 hours the numbness in the head had almost disappeared and she maintained that she was in much less pain.

Mrs. B. continued to improve* as far as the pain from the secondary deposits was concerned but later developed symptoms of uraemia. She was found to have suppression of urine. She developed secondary deposits in the kidneys and there were masses compress-

nique of treating the secondary deposits with X-ray therapy, as they developed, it was decided to do a radon implant. Unfortunately, there was an interval of several months before the apparatus was delivered in Johannesburg.

In this patient difficulty was encountered in doing the implant as there was some obstruction in her nose which deflected even the heaviest of the trocars (Fig. 14D). The attempts to implant through the right nostril had to be abandoned and the implantation was then made through the left nostril. This caused further difficulty in spacing the seeds, particu-

* We are indebted to Dr. H. Segal and Mr. S. Hoffman for the continuation notes.

ing the ureters. She ultimately died of uraemia. Dr. Segal stated that pyelogram films showed that some of the secondary deposits which had been present prior to the implantation had calcified.

The implantation of the radon because of the rapid relief of pain in spite of the very numerous secondary deposits in a patient who had had a carcinoma of the breast for some 7 years, the first 5 of which without treatment, was definitely justified.

The notable features in this patient were:

- i. The lack of side effects from the implantation, in spite of the fact that considerable difficulty had been encountered due to obstruction in the nose (which prolonged the time taken to do the implant) and
- ii. The rapid relief of pain from innumerable secondary deposits.

CASE 2

Mrs. M. J. S. was 38 years when first seen in April 1954. In 1950 she had had a duct papilloma removed from the right breast. In March 1954 she discovered accidentally a lump the size of a golf ball under the left nipple. She also noticed that the left breast looked 'crooked' and that the nipple was drawn upwards. There was no discharge or bleeding from the nipple.

The late Mr. Dreosti performed a radical operation on 26 March 1954. This was followed by post-operative radiotherapy. Sections showed the presence of an adenocarcinoma with infiltration of the axillary glands. Almost exactly a year later (in April 1955) she started to complain of pain in the right ilium which was X-rayed and showed extensive involvement with secondary deposits (Fig 15). She improved with X-ray and hormonal therapy, but after an interval of another year, i.e. in June 1956, she developed numerous secondary deposits in the pelvis. Some of the original deposits in the right side of the pelvis had become calcified. She had secondary deposits also in the dorsal and lumbar vertebrae and ribs (Fig. 15B). In spite of further X-ray treatment she continued to complain of severe pain in the right hip joint and in the right ribs. Because of these widespread secondary deposits it was decided to do a radon implant.

This patient, too, complained of a feeling of pressure at the vertex of the skull for several days after the implant.

The severe pain in the right hip joint disappeared within 2 days of the operation. She complained of dim vision in the right eye for a few days. The patient developed more secondary deposits some months after the implantation and a bilateral pleural effusion. Her general condition deteriorated and she died 8 months after the implantation.

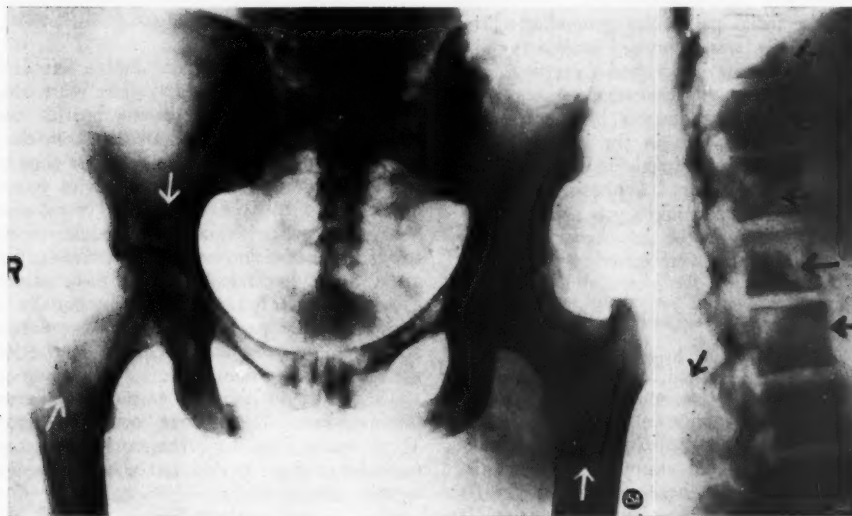


Fig. 15a. Case 2: Secondary deposits in the pelvis, acetabulum and femora.

Fig. 15b. Case 2: Secondary deposits in the lumbar and dorsal vertebrae.

CASE 3

Mrs. B. was aged 48 years.* Four years before the implantation she experienced acute pain in the left hip which caused her to fall to the ground. She was unable to get up and had to be picked up. She was put to bed for 2 weeks. The diagnosis was sciatica. The pain persisted and she walked with great difficulty. She was subsequently admitted to a hospital for physiotherapy which did not give any relief of her symptoms. As the family migrated to the Free State, she was subsequently X-rayed by Dr. Gillwald, who advised deep X-ray therapy for secondary deposits. She received this treatment at a hospital about 3 years ago. She stayed at the hospital for about 10 weeks. She stated that the deep X-ray therapy did not relieve her symptoms to any appreciable extent. She had also been put on testosterone, 50 mg. daily for about one month. At this stage she was slightly ambulant and was able to get around by pushing a chair in front of her and later was able to walk with the aid of walking sticks. The pain, however, persisted and in December 1955 she developed pain in the mental region of the mandible. The left side of the mandible felt anaesthetic while the right side was markedly hypo-aesthetic. Movement of the mandible precipitated severe pain.

She had been put on Primotestone, 250 mg. weekly for 6 weeks, and this had caused some improvement in the skeletal pain, but did not affect the facial pain. Her general condition was bad, she was depressed and nervy, her voice had become husky, and there was facial hirsutism due to the testosterone.

When Dr. Hirsowitz saw her, there was a scarred indurated area in the left breast and a small gland was palpable in the left axilla. There was a mid-dorsal kyphosis. Movement of the spine and hip joints was painful. There was shortening of the left lower extremity. The cranial nerves were intact except for:

1. A deviation of the protruded tongue to the left.
2. An area of diminished sensation in the left mental region.
3. An area of acute hyper-aesthesia in the right mental region.

Her chest was clear and there was nothing abnormal in her abdomen.

The various investigations showed her blood count to be within normal limits but her E.S.R. was 50 mm., her urea 21 mg. per 100 c.c., the inorganic phosphate 3 mg. per 100

c.c., the alkaline phosphatase 23.8 King-Armstrong units, and the acid phosphatase 3.3 King-Armstrong units.

Progress of the Case. She continued to have pain, which at times was very severe, but her main anxiety was the severe mandibular pain necessitating a mental block and deep therapy to the mandible. None of these procedures relieved the parasthesia. She was kept on androgens all the time.

She was referred to us by Dr. Hirsowitz for an implantation on 25 July 1956. It should be noted that a bilateral adrenalectomy had been advised before but the patient had refused to submit to this operation.

The implantation was carried out without any difficulty. There were no side effects but she did not derive any real benefit. She died 4 months after the implantation.

When we consider the length of time this patient had had the secondary deposits (for about a year without any treatment at all) and the extent of the secondary deposits, we could scarcely have expected any result, but it indicates that even in these terminal stages the implantation can be carried out without any considerable discomfort to the patient.

Fig 16 indicates the extent of the disease in the pelvis, the hip joints and the skull. This patient also had secondary deposits in the spine. Fig. 16c shows the distribution of the 3 seeds in the pituitary.

CASE 4

Mrs. R., aged 47 years, had had a left Halsted operation done in 1954, four years after she had noticed a lump in the breast. She had an extensive course of post-operative deep X-ray therapy. Her symptoms at the time of the implantation were loss of weight, vomiting, anorexia and pain in the left breast area. She was emaciated, there were nodules in the scar of the excision in the left breast, left axilla, left supraclavicular glands, right parotid glands and there were a number of nodules in the skin of the back. The liver was enlarged and there were secondary deposits in the left ribs and the left femur.

There was no difficulty encountered in the implantation. There were no side effects. There was a little improvement in her symptoms for a short period but she died a few months later.

CASE 5

Mrs. I. J., aged 52 years, had had a left Halsted performed 8 years before. Two years

* We are indebted to Dr. L. Hirsowitz for these clinical notes.



Fig. 16a. Case 3: Numerous secondary deposits in the pelvis with destruction of the left hip joint.

Fig. 16b. Case 3: Secondary deposits in the skull.

Fig. 16c. Case 3: Three seeds in the pituitary fossa.



ago she had a hysterectomy for fibroids. Soon after this operation she started to complain of severe back-ache, particularly in the lumbar region. She had had a course of deep X-ray therapy after the operation and had also had deep X-ray therapy for the pain in the back. Some 5 months ago she developed defective vision in the left eye and 2 months ago she had difficulty in seeing with the right eye. She had to keep this eye closed to avoid double vision.

For about a year nodules had been appearing under the scalp and more recently, these increased. She had had deep X-ray therapy during 1955 and 1956. In September 1956 she had been referred for further deep X-ray therapy. At that time an X-ray examination by Dr. Bezuidenhout revealed extensive secondary deposits throughout the lumbar spine, pelvis, femora, ribs and cranium. There was collapse of L 3 with pathological fractures of

the 4th, 5th and 10th ribs on the right side. There was destruction of the inferior wall of the left optic foramen. She was given a course of deep X-ray therapy and was put on testosterone propionate.

There was some improvement in her condition but she still complained of pain in the right leg. She was confined to bed because of the difficulty and pain on moving.

She improved for a time but her symptoms recurred and in March 1957 she was referred for a pituitary implant.

Fig. 17 shows the extent of the disease in the skull, the cervical spine, both humeri and ribs. She also had numerous deposits in the remainder of the skeleton. Numerous nodules could be felt in the scalp and over the chest wall. Dr. A. Friedman examined her eyes and stated:

'There was a ptosis of her left upper lid, and also complete paralysis of the right external rectus. There was no evidence of secondaries in the orbits or the choroid.'

He felt that there was a bilateral lesion in the brain or that there were secondary deposits in the orbits.

Mr. Kerr reported that she had bilateral papilloedema, that there was a right 6th nerve weakness and also impairment of sensation over the right first and second divisions of the 5th nerve.

The implantation was carried out without difficulty by Mr. Kerr and there were no side effects. The immediate result of the implantation was extraordinary. On the morning

after the implantation the patient stated that she was almost free from pain and 48 hours after the implantation she managed to get out of bed although she had been in bed for months. At the time she was discharged from the hospital, i.e. a few days after the implantation, she stated she was almost completely free from pain.

When patients with secondary deposits in almost every bone in the body and also numerous soft tissue deposits, and who have

been bed-ridden for months, can be made free from pain within a day of the implantation, there would appear to be considerable justification for this method of treatment.

CONCLUSIONS

1. The implantation of radon seeds into the pituitary was introduced following Olivecrona's hypophysectomy for the treatment of secondary deposits from carcinoma of the

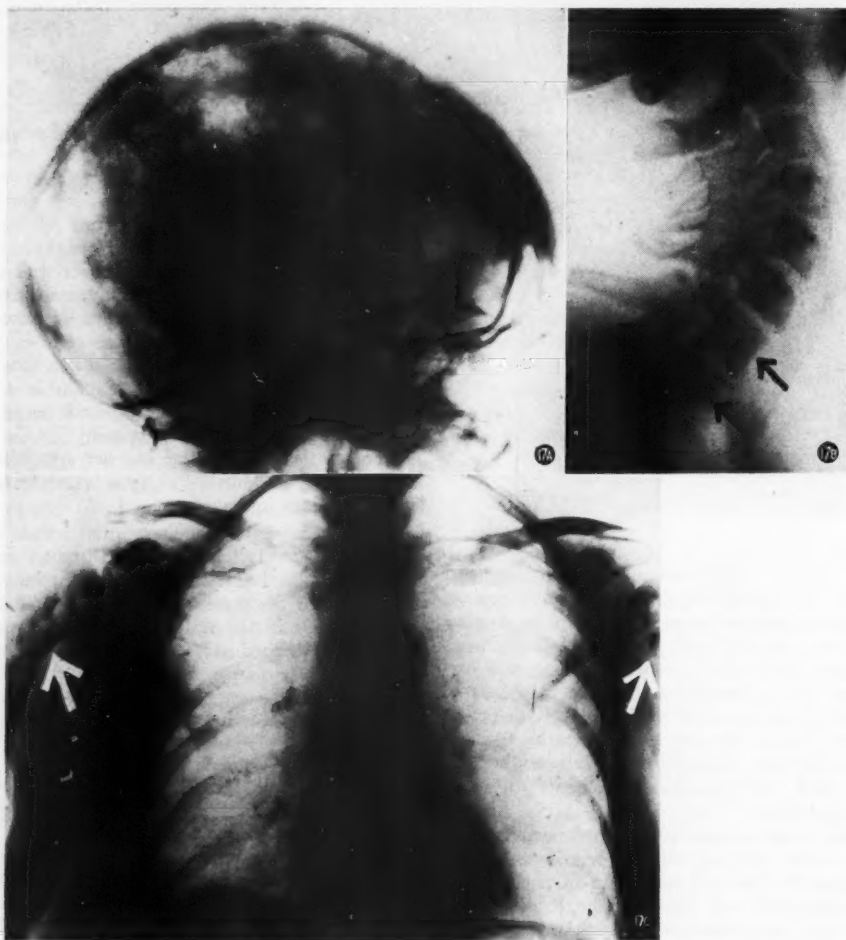


Fig. 17a. Case 5: Extensive secondary deposits in the skull. Note that although the sphenoidal sinus is infiltrated by growth, it did not cause any difficulty with the implantation.

Fig. 17b. Case 5: Secondary deposits in the cervical spine.

Fig. 17c. Case 5: Extensive secondary deposits in the ribs and the heads and necks of both humeri.

breast. Olivecrona had found hypophysectomy useless for secondary deposits from other malignant conditions such as malignant melanomata.

2. The implantation of radon is a much simpler procedure than a hypophysectomy and does not involve an open operation with its surgical risks.

3. The implantation of radon is a much simpler procedure than bilateral adrenalectomy, which is a major operation in cases with advanced secondary deposits and which gives satisfactory results in only about 60% of cases.

4. The radon implantation is carried out with the help of special apparatus designed to guide the trocar into the anterior pituitary through the nasal route. The operation, from the surgical aspect, is extremely simple; but it requires very careful radiological guidance which entails numerous films when screen intensification apparatus is not available.

5. The length of the operation varies with the number of films to be taken and the presence of any nasal obstruction which may deflect the trocars. In a case without obstruction the whole procedure of implanting 3 radon seeds should take about an hour. In an attempt to reduce the time 2 seeds of 8 mcs. may be used, one seed through each nostril. This would also be an advantage in patients with small pituitary fossae.

6. Other radio-active isotopes such as radio-active gold seeds or yttrium have been used to get the beta effect only, as radon also has a gamma ray. Liquid radio-active gold has been used, but this requires an open operation.

7. There has been no difficulty in the implantation in the 5 cases we have so far done and there were no immediate side effects or disabilities associated with the implantation.

8. Apart from the sensation of pressure at the vertex in 2 of the cases, the patients made no complaints following on the introduction of the radon.

9. Although all our patients were far advanced and in a terminal condition, three of them stated there was some relief from pain as early as 24 and 48 hours after the introduction of the radon. Case 5, whose skull, cervical spine, shoulders, ribs and pelvis were extensively involved and who had been in intractable pain and bed-ridden for months, had relief from pain within 24 hours and was able to get out of bed and walk about her room.

In only one of our cases was there any effect on the eyes. This was a partial loss of

vision in one eye.

The procedure of implantation of the radon seeds is so simple that, as the results are stated to be similar to those of bilateral adrenalectomy, it would appear to be preferable to the latter operation, which can always be carried out if the implantation fails.

No large series of cases have yet been published in the literature, but the indications from the cases reported would appear to be very favourable.

10. This communication is not intended as an analysis of the results of treatment or an appraisal of this method of treatment. It is merely a preliminary report describing the apparatus and the technique employed and the difficulties which may arise in the course of radon implantation into the pituitary. It is also intended to show that there is no risk of infection, that there are no side effects and that, in spite of the very far advanced disease in all these patients, there was no difficulty in doing the implantations.

We have so far deliberately selected very far advanced cases, but it is considered that the implantation of the pituitary in less advanced cases of secondary deposits from the breast would be justified.

OPSOMMING

1. Die inplanting van radonsaad in die harsingslymklier is toegepas na Olivecrona se operasie vir die verwydering van die hipofise vir die behandeling van sekondêre neerslae afkomstig van karsinome van die bors. Olivecrona het bevind dat hipofisektomie nutteloos is vir sekondêre neerslae afkomstig van ander kwaadaardige toestande, soos kwaadaardige melanomata.

2. Die inplanting van radon is 'n veel eenvoudiger prosedure as 'n hipofisektomie. Dit bring geen oop operasie met al sy meegaande chirurgiese gevare mee nie.

3. Die inplanting van radon is 'n veel eenvoudiger prosedure as tweesydige adrenalectomie. Laasgenoemde is 'n groot operasie in die geval van pasiënte met 'n gevorderde sekondêre neerslag, en slegs in ongeveer 60% van die gevalle het dit 'n bevredigende afloop.

4. Die inplanting van die radon word gedoen met behulp van 'n spesiale apparaat wat ontwerp is om die trokar deur die neus na die voorste harsingslymklier te lei. Uit 'n chirurgiese standpunt is dit 'n buitengewoon eenvoudige operasie; maar dit vereis uiters sorgvuldige radiologiese leiding wat die gebruik van talle films meebring as skermversterkingsapparaat nie beskikbaar is nie.

5. Die duur van die operasie hang af van die aantal films wat geneem word, en die aanwesigheid van enige neusversperring wat die trokar kan deflekter. In 'n geval sonder obstruksie behoort die hele proses verbonde aan die inplanting van 3 radon-sade ongeveer 'n uur in beslag te neem. In 'n poging om die tyd te verminder kan 2 sade van

8 mcs. gebruik word—een saad deur elke neusgat.

6. Ander radio-aktiewe isotope, soos radio-aktiewe goudsaad of yttrium is ook gebruik om slegs die beta-effek te verkry, aangesien radon ook 'n gamma-straal het. Vloeibare radio-aktiewe goud is gebruik, maar hiervoor is 'n oop operasie nodig.

7. Geen moeilikheid is ondervind met die inplanting in die 5 gevalle wat ons tot dusver behandel het nie, en die inplanting het geen onmiddellike bykomstige effekte of gebreke meegebring nie.

8. Afgesien van 'n drukkende gevoel in die vertex by 2 van die gevalle, het die pasiënte geen klagtes gehad na die inplanting van radon nie.

9. Hoewel al ons pasiënte ver gevorderd was en in 'n eindstandige toestand verkeer het, het 3 van hulle verklaar dat daar verligting van die pyn was binne 24 tot 48 uur na die inplanting van die radon. Geval Nr. 5, wie se skedel, nekruigraat, skouers, ribbes en bekken erg aangetas is, en wat maande lank aan hardnekkige pyn gely het en in die bed moes bly, het binne 24 uur verligting van pyn ondervind, en was in staat om uit haar bed uit op te staan en in die kamer rond te stap.

In slegs een van die gevalle was daar enige effek op die oë. Dit het bestaan uit die gedeeltelike verlies van die gesigsvermoe van een oog.

Die inplantingsprosedure is so eenvoudig dat, aangesien daar gemeen word dat dit dieselfde gevolg as tweesydige adrenalectomie het, dit skynbaar verkieslik is bo laasgenoemde operasie wat altyd gedoen kan word indien die inplanting nie slaag nie.

Slegs in klein aantal gevalle is tot dusver in mediese tydskrifte beskryf, en tog skyn dit asof die gerapporteerde gevalle besonder gunstige indikasies opgelewer het.

10. Hierdie mededeling gee nie voor om 'n ontleding van die resultate van die behandeling te wees nie. Nog minder word enige poging aangewend om die waarde van hierdie behandelingsmetode vas te stel. Dit is bloot 'n voorlopige verslag bevattende 'n beskrywing van die apparaat en die tegniek, sowel as van die moeilikhede wat bes moontlik kan ontstaan in die loop van radoninplanting in die harsingslymklier. Dit toon ook aan dat daar geen gevaar van infeksie is nie, dat dit geen bykomstige effekte meebring nie, en dat, ondanks die feit dat die siekte by al hierdie pasiënte reeds 'n ver gevorderde stadium bereik het, die inplanting self geen moeilikhede opgelewer het nie.

Ons het tot dusver doelbewus die ver gevorderde gevalle uitgesoek, maar daar word gemeen dat die inplanting van radon in die harsingslymklier in

minder ver gevorderde gevalle van sekondêre neerslae vanaf die bors ook geregtig sal wees.

We are very grateful to Mr. N. Pierce, of the Physics Department, Westminster Hospital, who constructed the apparatus for us with the kind permission of Sir Stanford Cade and Professor Wilson. We are indebted to Dr. Peter Kerley of the Westminster Hospital for Figs. 1 and 2.

We are very grateful to Mr. J. Douglas and Mr. E. B. H. Trehair for their encouragement and support of this method of treatment and to Mr. E. M. Kerr for his collaboration in Case 5.

We are indebted to Dr. L. Hirsowitz for his clinical notes on Case 3 and to Dr. H. Segal and Mr. S. Hoffman for the notes on Case 1.

We wish to thank Drs. E. Samuel, C. Komins, M. Denny and L. Morris and Drs. M. H. Fainsinger and D. R. Morris for the pre-operative X-ray films of the patients reported.

REFERENCES

- Weinbrein M., Henning, A. J. H. and Cones, D. M. T. (1955): *Med. Proc.*, **1**, 50.
- Northfield, D. W. C. (1949): *Proc. Roy. Soc. Med.*, **42**, 845.
- Taylor, G. W. (1938): *Amer. J. Roentgenol.*, **39**, 419.
- Woolley, G. W. (1950) *Quoted in the Editorial* (1956): *Lancet*, **1**, 676.
- Bergental, D. M. and Huggins, C. (1951): *J. Amer. Med. Assoc.*, **147**, 101.
- Cade, S. (1954): *Roy. Coll. Surg.*, **15**, 71.
- 6a. Cade, S. (1955): *Brit. Med. J.*, **1**, 1.
- Luft, R. and Olivecrona, H. (1953): *J. Neurosurg.*, **10**, 301.
- Forrest, A. B. M. and Peebles Brown, D. A. (1955): *Lancet*, **1**, 1054.
- Forrest, A. B. M. and Peebles Brown, D. A. (1956): *Lancet*, **1**, 399.
- Greening, W. P. (1956): *Lancet*, **1**, 728.
- Huggins, C. (1952): *Cancer Research*, **12**, 134.
- Davies, F. L. (1956): *Lancet*, **1**, 671.
- Rothenberg, S. F., Jaffe, H. L., Putnam, T. S. and Simpkin, B. (1955): *Arch. Neurol. Psychiat.*, **73**, 193.
- Kerr, H. D., Flock, R. H., Elkins, H. B. and Culp, D. A. (1953): *Amer. J. Roentgenol.*, **69**, 969.
- Emerson, Jr., K. and Jessiman, A. G. (1956): *New Eng. J. Med.*, **254**, 252.

ELECTROCARDIOGRAPHIC CASE BOOK

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[The case records and the electrocardiograms in this series provide the reader with an opportunity for an exercise in electrocardiographic interpretation.

In each case the history and the unmarked ECG is presented, so that the reader can make his own provisional diagnosis. On another page in this issue, additional clinical data, together

with an annotated ECG, provide a diagnosis against which the reader can check his own interpretation—*Editor.*]

CASE NO. 1

History. A 52-year-old European male said that 24 hours before admission he felt a severe constricting substernal pain which radiated in-

to the neck and down both arms. The pain was only partly relieved by a morphine injection, which was the only medication he had received before admission.

The relevant electrocardiographic findings (recorded on the third day after commencement of the substernal pain) are shown in Fig. 1.

(Further data on p. 264)

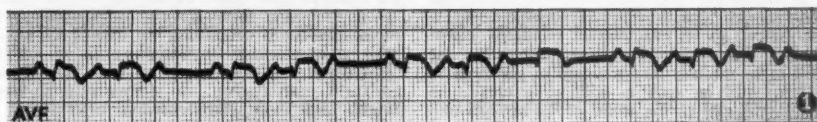


Fig. 1. Case 1. Unannotated.

CASE NO. 2

History. A 75-year-old European male was admitted complaining of breathlessness on exertion for 7 months. He had also noticed swelling of the legs for 5 months. There had been no syncopal attacks.

He had not received any medication before admission.

The relevant electrocardiographic findings (recorded on the day of admission) are shown in Fig. 2.

(Further data on p. 265)

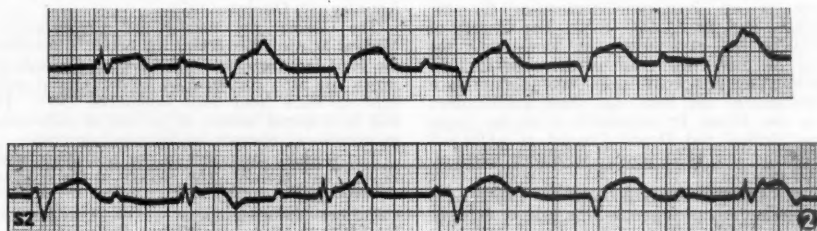


Fig. 2. Case 2. Unannotated. Continuous strip. Standard lead 2.

NOTES AND NEWS · BERIGTE

EXAMINATIONS TO BE CONDUCTED BY THE COLLEGE OF PHYSICIANS AND SURGEONS OF SOUTH AFRICA

Prof. G. A. Elliott, President of the College of Physicians and Surgeons of South Africa, has issued the following statement:

The College of Physicians and Surgeons of South Africa has announced its intention to hold its first post-graduate examinations in October 1957. The examinations, which will afford successful candidates entry to the College, are the Primary Examination for the Fellowship of the College of Surgeons (South Africa), the Fellowship of the College of Physicians (South Africa), and the Fellowship of the College of Obstetricians and Gynaecologists (South Africa).

At its meeting in March 1957, the South African Medical and Dental Council approved in principle that these three higher qualifications be recognized

as 'additional qualifications'. At the time that this matter was before the South African Medical and Dental Council, the exact titles of all the qualifications had not been settled, and therefore it was not possible for a formal recommendation to be made to the Minister of Education, Arts and Sciences that the higher qualifications be gazetted as additional qualifications. The titles have now been decided upon by the Council of the College.

It must be clearly understood that the qualifications of the College have in principle been accepted as *additional* qualifications. The question of their recommendation by the South African Medical and Dental Council for acceptance and gazettement by the Minister as *higher* qualifications for purposes of admission to the statutory Specialist Register of the South African Medical and Dental Council is still under discussion by the appropriate committees of the Medical Council.

The first Primary Examination for the F.C.S.(S.A.) will be attended by Sir Harry Platt, President of the Royal College of Surgeons of England, and it is hoped that the first examination for the Fellowship of the College of Physicians (S.A.) will be attended by Sir Russell Brain, President of the Royal College of Physicians of London. The examiners will be drawn from a panel already compiled by the Council of the College, and will include examiners with experience of the standard of higher qualifications of South African Universities which are already recognized as higher qualifications for the purposes of the Specialist Register, and with standards of overseas examinations of equal calibre.

It is difficult to set examination standards except by holding these examinations and permitting the standard to be studied. The standard of the Primary F.C.S.(S.A.) will be such as will be acceptable to the Royal College of Surgeons of Edinburgh and England as exempting from the Primary Examinations for the Fellowships of these two Royal Colleges. Any doubts that may exist in the minds of prospective candidates for the Primary F.C.S.(S.A.) regarding the ultimate acceptance of the Final F.C.S.(S.A.) by the South African Medical and Dental Council as a higher qualification in terms of the Specialist regulations will be allayed by the knowledge that they, having completed the Primary F.C.S.(S.A.), will at least be able to proceed overseas to take the Final Examinations of the Royal College of Surgeons of England or Edinburgh, both of which are registrable as higher qualifications in terms of the South African specialist regulations.

There is no Primary Examination for the F.C.P.(S.A.) and the F.C.O.G.(S.A.). The Council of the College has nevertheless, by announcing the holding of these two examinations, afforded the opportunity for prospective candidates to enter such examinations in the faith that these qualifications will in the future be registrable with the South African Medical and Dental Council as additional qualifications and, it is hoped, as higher qualifications as well.

The first examinations will be held in Cape Town. Future College examinations will be held in different centres in South Africa. Cape Town has been

selected for the first examinations for the main reason that the University of Cape Town has offered candidates for the Primary F.C.S.(S.A.) courses of instruction in Anatomy, Physiology and Pathology, in preparation for the examination.

Although not strictly relevant to the subject of its examinations, the College Council has announced that the Registrar of Companies has approved the inclusion in the College of Physicians and Surgeons of South Africa a division of Obstetrics and Gynaecology equal in standing with the divisions of Surgery and Medicine. Furthermore, the Council of the College will place before the second Annual General Meeting of the College, in September 1957, recommendations concerning the title of the College, with a view either to including in it not only 'Physicians and Surgeons', but also 'Obstetricians and/or Gynaecologists', or alternatively, to have a briefer and more comprehensive title which will cover the three major branches of Medicine, Surgery and Obstetrics and Gynaecology, without specifically naming any one.

The announcement of the College examinations is an expression of the College's faith in its own purposes, and the support which the examinations will in future be given will be an indication that one of its important purposes has been effected.

* * *

NUTRITION SOCIETY OF GREAT BRITAIN

The Nutrition Society will hold a symposium in London on *The Nutritive Value of Proteins* on Saturday, 12 October.

The Council for International Organizations of Medical Sciences has drawn the Society's attention to the *First International Conference on Radio-Isotopes* which has been convened by UNESCO and will be held in Paris from 9-20 September 1957. There will be a special section on the use of radio-isotopes in nutritional research in Man and animals.

The working languages of the conference will be English and French. The records of the conference will be published.

Further information may be obtained from UNESCO at 19 Avenue Kléber, Paris (16e).

ELECTROCARDIOGRAPHIC CASE BOOK

CASE No. 1

(Continued from p. 263)

Physical Examination. The patient was somewhat apprehensive but not dyspnoeic or cyanosed. There were no signs of congestive heart failure. The blood pressure was 130/75 mm. Hg. The peripheral pulses were weak with a rate of 120 beats per minute and occasional 'dropped' beats. There was no clinical cardiac enlargement. The heart sounds were distant. The 'dropped' beats occurred irregularly.

Clinical Diagnosis. Myocardial infarction with partial heart block or irregular ectopic contractions.

Treatment. Morphine was administered as necessary and he was given additional barbiturate sedation. Anticoagulant therapy was commenced on admission and quinidine sulphate grains 6 every eight hours was prescribed as a prophylactic measure against the possible development of ventricular tachycardia or fibrillation.

Course. His condition remained unchanged for a further 4 days when he suddenly collapsed. He became extremely dyspnoeic and cyanosed, no blood pressure was recordable, the peripheral pulses were imperceptible and the heart sounds were almost inaudible but irregular, with a very fast tachycardia. He died within a few minutes.

Electrocardiographic Interpretation. See Fig.

1, annotated above.

1. *The rate is approximately 120 cycles per minute.*

Explanation: Each large square on the recording graph represents 0.2 second. There

1) is again normal, viz. 0.16 second, and is followed by a progressive lengthening of the P—R intervals until conduction fails once again. This form of partial heart block is known as the Wenckebach phenomenon.

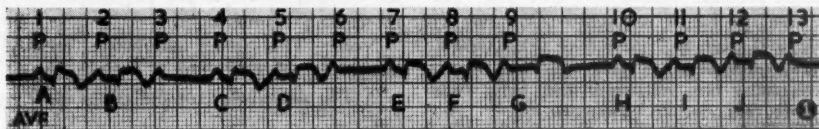


Fig. 1. Case 1. Annotated.

are roughly 6 cardiac cycles in the space of every 15 large squares, i.e. in every 3 seconds. Therefore in 60 seconds the rate would be 120 cycles per minute. (For another way of calculating the rate, see Case No. 2).

2. *The basic rhythm is sinus rhythm.*

Explanation: The P waves are normal in size and shape, and therefore the pacemaker is in the S-A node. Nearly all the P waves are followed by QRS complexes which are closely related to the P waves, thus indicating that the impulse initiated by the S-A node is conducted into the ventricles and initiates the ventricular complex.

3. *Partial heart block is present.*

Explanation: The P—R interval represents conduction through the auricular muscle, the A-V node and the bundle of His. Some of the P waves (3, 6 and 13 in Fig. 1) are not followed by QRS complexes. Thus conduction to the ventricles in these instances has been completely interrupted, no ventricular contraction has taken place, and a beat is said to be 'dropped'. Following such a 'dropped' beat or complex, the succeeding cycle has a normal P—R interval (A, C, E, and H in Fig. 1).

(Note: The P—R interval is measured from the beginning of the P wave to the beginning of the QRS complex, whether the initial QRS deflection is a Q or R wave).

The P—R interval (A in Fig. 1) occupies 4 small squares on the graph, each representing 0.04 second. The length of this P—R interval is thus 0.16 second. (Note: The upper limit of a normal P—R interval is 0.2 second). The succeeding P—R interval (B in Fig. 1) is 0.2 second and the following P wave (3 in Fig. 1) is not followed by a QRS complex, showing that conduction down the bundle of His has now failed completely. Following this 'dropped' beat, the next P—R interval (C in Fig.

There is no P wave after the QRS complex following P wave 9 in Fig. 1. This may be due to its absence, in which case momentary S-A block has occurred; or it may possibly be due to the P wave being hidden in the QRS complex. The fact that the T wave following this complex is not as deep as the preceding one suggests the latter possibility.

4. *A recent posterior myocardial infarction is present.*

Explanation: The S—T segment is raised, indicating that the electrode is facing the surface of the injured tissue.

The T wave is inverted, indicating that the electrode is facing ischaemic tissue.

The Q wave is not abnormally deep or widened, indicating that the infarct is not transmural.

These changes are recorded in lead AVF which usually 'faces' the posterior or diaphragmatic surface of the ventricles, thus denoting a posterior myocardial infarction.

Electrocardiographic Diagnosis. Recent posterior myocardial infarction complicated by partial heart block of the Wenckebach type.

Remarks. The occurrence of any cardiac arrhythmia as a complication of myocardial infarction is usually an ominous prognostic sign.

The cause of death in this case was probably ventricular fibrillation.

OPSOMMING

Die voorkoms van enige hart-arrhythmie as 'n ontwikkeling volgende op hartspier-infarkt is gewoonlik 'n onheilspellende prognostiese teken.

Die oorsaak van die dood in hierdie besondere geval was waarskynlik ventrikulêre fibrillasie.

CASE NO. 2

(Continued from p. 263)

Physical Examination. The patient was propped up in bed and was obviously dysp-

noeic. The jugular veins were engorged to 4 cm. above the sternal angle and occasional 'cannon' waves were visible.

The brachial and radial vessels felt sclerotic. The radial pulses were collapsing in type, and the blood pressure was 167/70 mm. Hg. The pulse was regular at a rate of 50 beats per minute and was not influenced by exercise, emotion, respiration or posture. The apical impulse was not felt, but the heart was moderately enlarged to percussion.

Although the heart sounds were distant, it was possible to identify a varying intensity of the first heart sound and a blowing systolic murmur at the apex. The rhythm was regular and the rate was 50 beats per minute.

Other signs of congestive heart failure such as basal crepitations, an enlarged tender liver and sacral and ankle oedema were present.

Clinical Diagnosis. Complete A-V heart block due to coronary artery disease, and complicated by congestive cardiac failure.

Treatment. A salt poor diet was prescribed and slow digitalization with digoxin was commenced. In addition, a mercurial diuretic was given twice weekly by intramuscular injection. Ephedrine was not administered as there was no history of Stokes-Adams attacks.

Course. The response to treatment was excellent. A satisfactory diuresis and a weight loss of 12 lb. was achieved in 14 days. Subjective improvement paralleled the disappearance of the signs of congestive cardiac failure. He was discharged on the 18th hospital day and was advised to continue with 0.25 mg. of digoxin twice daily for 5 days in every week. The arrhythmia however, was still present, and the heart rate remained unchanged at 50 beats per minute.

Electrocardiographic Interpretation. See Fig. 2 annotated.

1. The ventricular rate is approximately 50 cycles per minute.

Explanation: Each large square on the recording graph represents 0.2 second. There are 5-6 large squares between 2 ventricular complexes. If 6 is divided into 300 (300 large squares equal one minute), the result is the number of cycles per minute, in this case 50 cycles per minute.

Note: This is an alternative method of measuring the heart rate (Cf. Case No. 1).

2. The ventricular rhythm is not quite regular.

Explanation: This is probably due to the multifocal origin of the ventricular cycles (Vide infra).

3. The ventricular complexes are wider than normal (they should not exceed 0.12 second) and vary in size and shape from complex to complex.

Explanation: The site of the ventricular pacemaker varies from moment to moment and as a result the pathways of depolarization are inconstant and intricate. Furthermore, conduction in muscle tissue is slower than in specialized conduction tissue. This will cause a broadening of the cycle. The result is a widened, bizarre and variable QRS complex. In effect the complexes are multifocal ventricular ectopic beats.

4. The S-T segments are raised.

Explanation: This is a secondary to the disturbed and intricate course of depolarization.

5. The auricular rate is 85 cycles per minute.

6. The auricular rhythm is regular. (Note the regular spacing of the vertical lines marking the P waves in the lower tracing in Fig. 2).

7. The P waves bear no relationship whatsoever to the QRS complexes and as they occur with absolute regularity they are sometimes hidden within the QRS complexes.

(The site of any particular P wave is easily determined by measuring the interval between 2 obvious P waves with calipers and then, with this measurement, gauging the predicted site

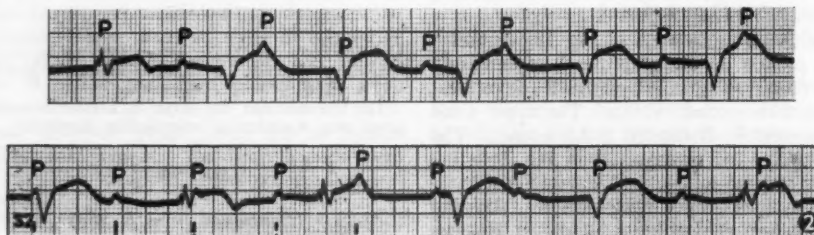


Fig. 2. Case 2. Annotated. Continuous strip. Standard lead 2.

of each of the other P waves).

Explanation: Conduction has been completely interrupted down the A-V node and the bundle of His and as a result the auricles and the ventricles each have their own pacemakers which act independently of each other. This condition is known as complete heart block or complete A-V block.

Electrocardiographic Diagnosis. Complete A-V heart block.

Remarks. In complete A-V block the ventricular pacemaker may be situated anywhere along the bundle of His or in the ventricular musculature. The more caudal this situation,

the slower the ventricular rate and the more bizarre the QRS complex. *Vice versa*, the nearer the pacemaker to the A-V node, the more normal the ventricular complex and the faster the rate.

OPSOMMING

In gevalle van algehele A-V-versperring is die ventrikulêre gangmaker waarskynlik geleë erenswaar langs His se bondel, of in die ventrikulêre spierstelsel. Hoe meer kaudaal dit geleë is, hoe stadiger is die ventrikulêre tempo en hoe meer eksentriek is die QRS-kompleks. Omgekeerd, hoe nader die gangmaker aan die A-V-knoop is, hoe normaler is die ventrikulêre kompleks en hoe vinniger die tempo.

PREPARATE EN TOESTELLE

K.285-HANDSKOENPOEIER

Hierdie nuttige produk is tans verkrygbaar in 'n reeks gerieflike groottes— $\frac{1}{2}$, 1, 5 en 12½ kilogram.

Die kodeletters K.285 verwys na die proefnemings wat deur die Boots Pure Drug Company, van Nottingham, Engeland,



gedoen is in 'n poging om 'n doeltreffende en veilige plaasvervanger vir talk in die chirurgiese praktyk te vind. Nadat talle moontlike samestellings ondersoek is, het dit gebleek dat die doeltreffendste 'n suiwer mielietysel is wat deur chemiese en fisiese metodes gewysig is om dit meer absorberend te maak.

K.285-handskoenpoeier word heeltemal deur die weefsels weggeruim sonder enige gevaar van granuloom of vasklewing; dit het hoegenaamd geen prikkelende effek op die hande nie; dit besit uitstekende gladmakende eienskappe en dit kan sonder enige beskadiging gesteriliseer word of deur outoklaaf of deur droë hitte. Gedurende lang operasies het dit waardevolle absorberende eienskappe.

Die poeier is volkome leweloos, en is 'n nuttige middel vir die plaaslike aanwending van antibiotica. Dit het geen effek op handskoene of ander chirurgiese toerusting nie. In talle belangrike hospitale dwarsdeur die wêreld het K.285-handskoenpoeier die plek van talk in die operasiesale volkome ingenieem, en 'n einde gemaak aan die gevaar van talkbesmetting van die weefsels. So min soos 3.0 g. sal 'n paar chirurgiese handskoene op 'n uiters doeltreffende wyse gladmaak.

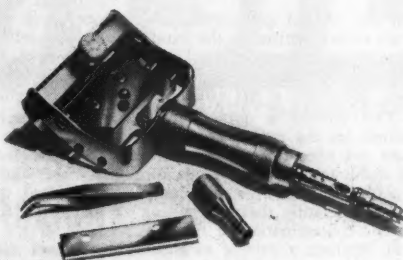
'STREAM-LINE' DERMATOOM

Medical Distributors van Jeppestraat 236, Johannesburg, is aangestel as die Alleen Suid-Afrikaanse Verspreiders van die 'Streamline' Dermatoom, wat ver-

vaardig word deur die Concentric Maatskappy van Birmingham en waarvan die eerste besending so pas ontvang is.

Hierdie kragaangedrewe masjiene het baie voordele in vergelyking met die 'vryhand' metode om 'n velsnit te maak. 'n Huidreep 3 duim breed met 'n lengte wat afhang van die huidoppervlakte waar dit geneem word kan feitlik outomaties gesny word. Die Intern kan binne 'n paar minute leer hoe om hierdie instrument te hanteer sodat die Sjirurg vry is om sy volle aandag te skenk aan die fynere puntjies wat so noodsaaklik is vir 'n geslaagde veloorplanting. Huidrepe van eenvormige dikte kan baie vinnig verkry word en geen lastige toebehore soos gom, sement of suigapparate is nodig nie.

Spied by die sny van huidrepe het die volgende groot voordele:



1. Terwyl groot gedeeltes van die huid binne 'n paar minute van die huidoppervlakte geneem kan word, word 'n drukverband net so spoedig aangebring met die gevolg dat weinig bloed verloor word. Dit is 'n groot voordeel by die voorkoming van skok wanneer uitgebreide veloorplantings onderneem word.

2. Aangesien 'n groot velreep gesny kan word sonder dat die onmiddellike aangrensende veloppervlakte deur bloed vertroebel word, kan die gedeelte langsaan ook dadelik gebruik word vir 'n snit.

3. Met die gebruik van hierdie masjiene word die vel glad en skoon gelaat wat natuurlik die beste

omstandighede is vir 'n spoedige genesing; sodoende kan dieselfde veloppervlakte na 'n paar weke weer gebruik word.

Die snelheid waarmee 'n snit aangebring word (5,000-7,000 frekwensie per minuut) verseker skoon en gladde reep met skerp, gelyke kante wat 'n voordeel is vir die Sjiurg met die inpassing van hierdie reep met die oppervlakte waar dit aangebring moet word en met die verdere vashegting van die kante.

Die dikte van elke snit word beheer deur gebruik

te maak van die mikrobeheerknop wat in die middel van die masjien aangebring is. Enige dikte van die dunste gesplete huidreep tot een van 0.050 duim kan geneem word, elke verdeling op die beheerknop verteenwoordig 0.002 duim. Die dikte van elke afsonderlike reep kan nagegaan word deur die spasie tussen die snykant van die lem en sy boonste beskutting te ondersoek.

Verdere Besonderhede: Medical Distributors, Postbus 3378, Johannesburg.

PREPARATIONS AND APPLIANCES

K.285 GLOVE POWDER

This useful product is now available in a range of convenient sizes— $\frac{1}{2}$, 1, 5 and 12½ Kilos.

The Code Letters K.285 refer to experiments carried out by Boots Pure Drug Company of Nottingham, England, to find an effective and safe substitute for talc in surgical practice.



After many possible compounds had been examined, the most efficient was proved to be a pure maize starch, modified by both chemical and physical means and thereby rendered absorbable.

K.285 Glove Powder is completely disposed of by the tissues with-

out any risk of granuloma or adhesions; it is free from irritant action on the hands; possesses excellent lubricating properties; and may be sterilized by either autoclave or dry heat without damage. During long operations it has valuable absorbent properties.

This powder is quite inert, and forms a useful vehicle for the topical application of antibiotics. It does not affect gloves or other surgical equipment. In many important hospitals throughout the world, K.285 Glove Powder has completely replaced talc in the operating theatres, putting an end to all risk of talc contamination of tissues. As little as 3.0 g. will lubricate a pair of surgical rubber gloves most effectively.

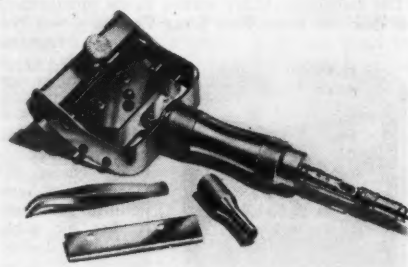
THE 'STREAM-LINE' DERMATOME

Medical Distributors, of 236 Jeppe Street, Johannesburg, have been appointed Sole South African Distributors for 'Streamline' Dermatomes, made by the Concentric Company of Birmingham. The first shipment of these appliances has just arrived in the country.

These power-driven machines have many advantages compared with the 'free-hand' method of skin graft cutting. A graft 3 inches wide, of a length depending only on that of the donor site, can be cut almost automatically; a House Surgeon can learn

to operate this equipment in a few minutes, leaving the surgeon free to give his full attention to the finer details essential for successful skin grafting. Grafts of uniform thickness are very quickly obtained, and no troublesome accessories, such as glue, cement or suction caps are required.

Speed in graft cutting has the following very great advantages:



1. As large areas of skin can be taken in a few minutes from one donor site, a pressure dressing can be very quickly applied, with the result that the loss of blood is negligible. This is a considerable advantage in preventing shock in large grafting operations.

2. As a large graft can be cut without blood obscuring the immediately adjacent skin, this too is readily available as a donor site.

3. The use of these machines leaves the skin with a clean smooth surface, which is an excellent condition for rapid healing, with the result that the same donor site can be again used in a few weeks.

The high rate of cutting (5,000-7,000 strokes per minute) ensures clean and smooth grafts with sharp, straight edges which are advantageous to the surgeon in fashioning them to the size of the receiving area and suturing the edges securely in place.

The thickness of each graft is controlled by the use of a micro control knob in the centre of the machine. Any thickness from the thinnest split skin graft to one of 0.050 inch, can be taken, each division on the control knob representing 0.002 inch. A visual check on the thickness of each graft can also be made by examining the space between the cutting edge of the blade and its overhead guard.

Further Details from: Medical Distributors, P.O. Box 3378, Johannesburg.

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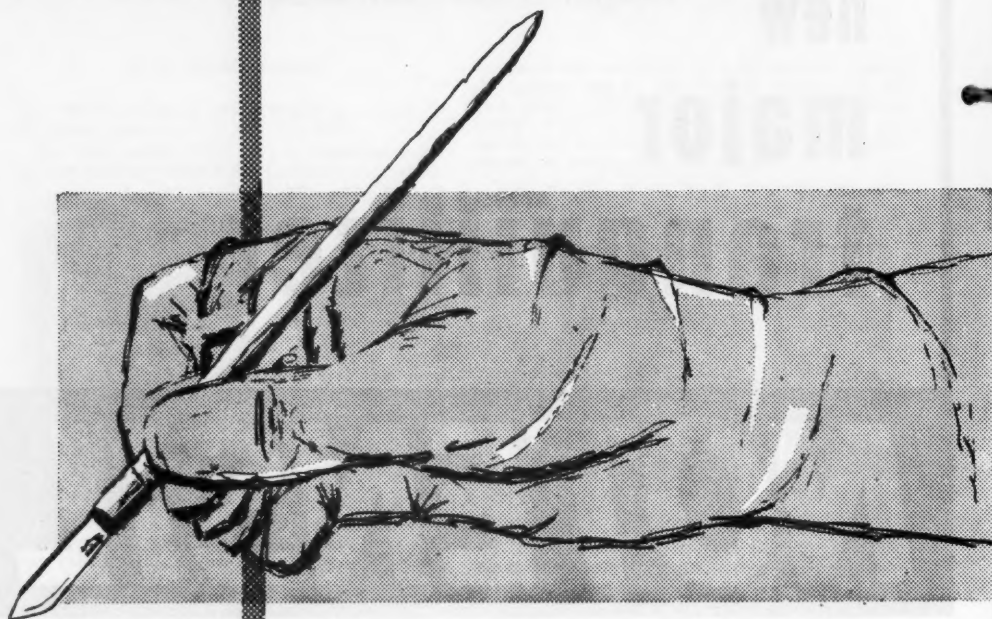
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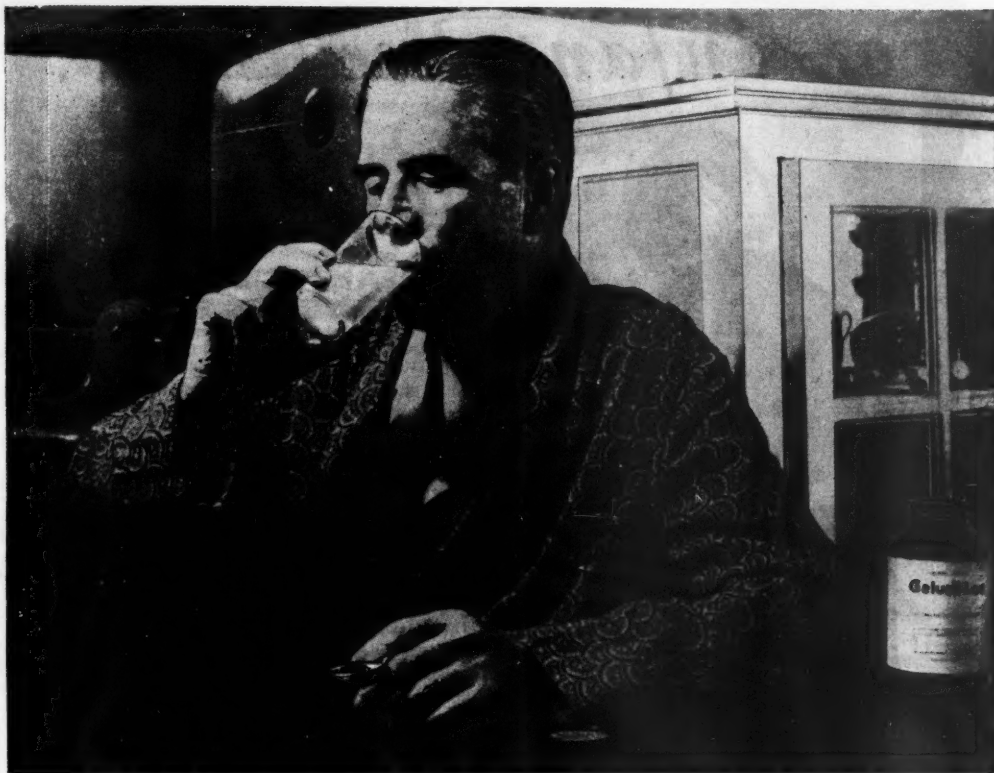
K.285 takes over from talc

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2. Lubricating properties equal those of talc.
3. Sterilization does not impair its lubricating properties.
4. Does not cause deterioration of gloves or other equipment.
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Extended nighttime protection: Gelusil-Lac combines the proven antacid action of Gelusil plus the sustained buffering effect of specially prepared high protein (low fat) milk solids.

The formula is designed to *prevent* the onset of gastric pain at night, especially "middle-of-the-night" attacks.

Nonconstipating: Gelusil's aluminium hydroxide component is of a low order of chemical reactivity, hence the formation of astringent — and constipating — aluminium chloride is minimal.

Dosage: 2 Gelusil tablets two hours after eating or when symptoms are pronounced. Each tablet: 7½ gr. magnesium trisilicate and 4 gr. aluminium hydroxide gel. **Gelusil-Lac:** at bedtime, one heaping tablespoonful stirred rapidly into one-half glass (4 fl. oz.) of cool water. (Provides equivalent of 4 Gelusil tablets.)

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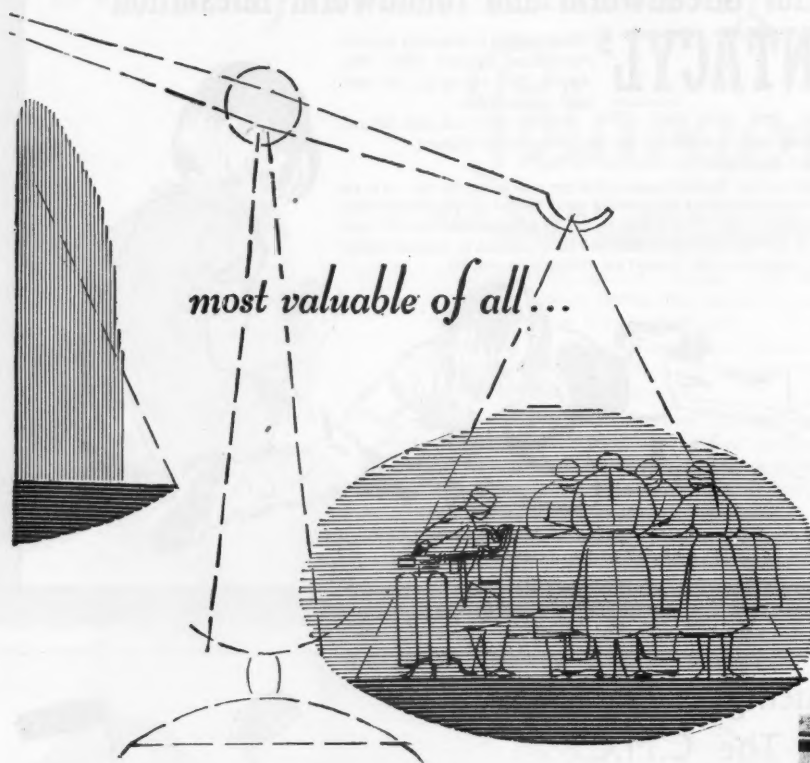
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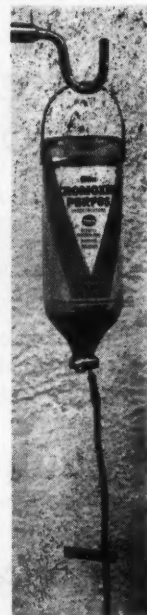
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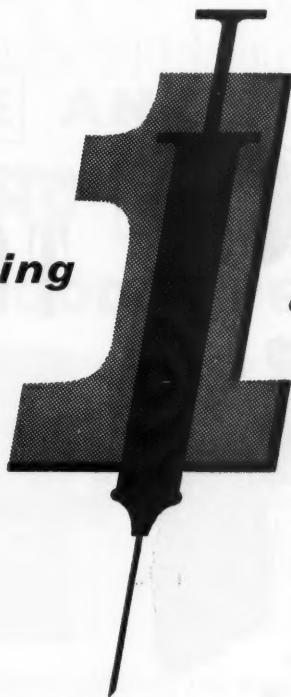
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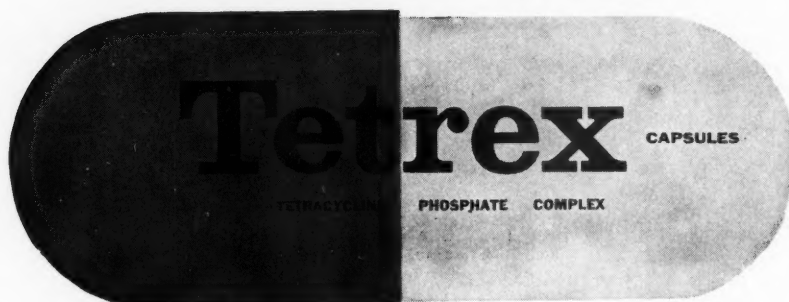
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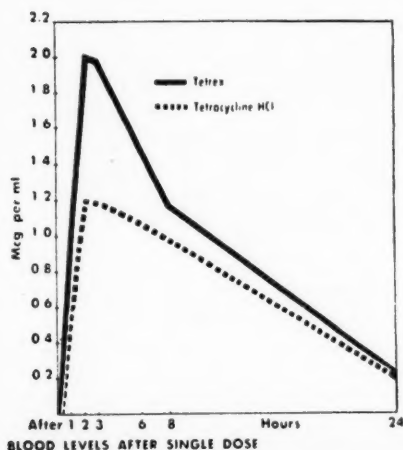
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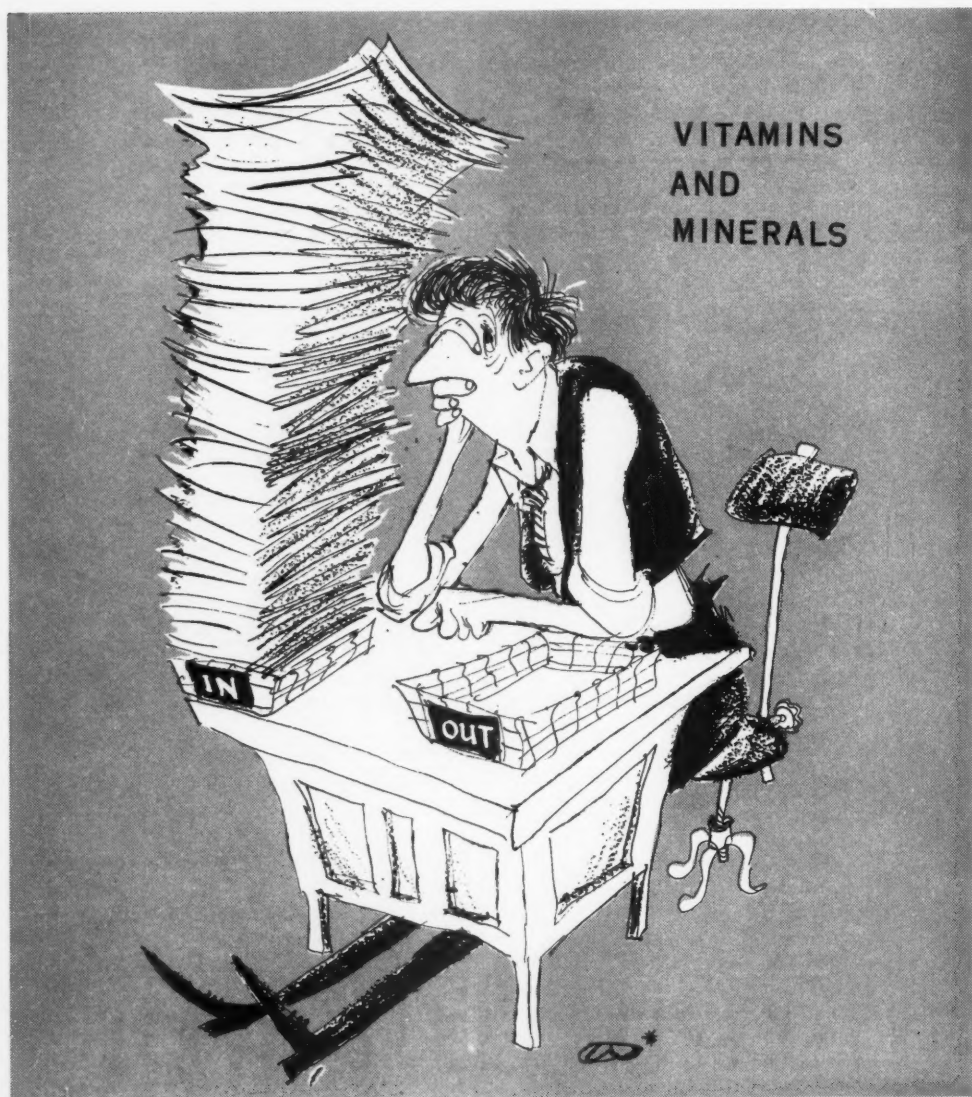


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